

# MARINE REVIEW.

VOL. XI.

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No. 24.

## Improved Outlook in the Ore Business—New Ships.

As a result of the general improvement in lake business thus far this season, especially in the ore trade, there is already some figuring with ship builders for new freight carriers to come out next spring. Vessel owners look for sales of ore early next spring, if improvement in the iron industry holds out on the basis of present conditions.

The best indication of confidence in the iron ore business is the demand that has developed within the past week or ten days for stock in such companies as Minnesota, Chandler, Pittsburg and Lake Angeline and other leading corporations producing high-grade Bessemer ore. The market for iron mining stocks, which has been almost entirely neglected by dealers in securities for two years past, has really assumed a part of the activity that was characteristic of it previous to 1890. John J. Shipherd of Charles H. Potter & Co. of Cleveland, a firm that has for years past held the largest trade in these securities, says that the renewal of trading in them is important. Sales of Minnesota are reported at \$66 and Chandler at \$35. These figures represent an increase of \$10 or more per share over the lowest price at which the stock was sold during the long period of depression just past.

Vessel owners who are talking of new ships are prompted somewhat by these conditions, but next year's business is, of course, far off as yet, and then, too, manufacturers of ship material are asking increased prices and the tendency in the market for material as well as labor is upwards, so that ship builders are unwilling to accept contracts at prices made to owners last year. It is reported that the Cleveland Ship Building Company a few days ago refused to duplicate the steamer Chili, recently built for M. M. Drake and others of Buffalo, at the price paid for that boat.

## Northern Transit Co.'s Steamer Majestic.

Officers of the Great Northern Transit Co. of Collingwood, Ont., are of the opinion that they have a very good passenger boat in the new steamer Majestic, which is to be engaged on the north shore of Georgian bay, on the route between Collingwood and Sault Ste. Marie. The boat will not go into service until June 27, but she has been given sufficient trial to look for good results in speed. Mr. A. R. Rankin of Collingwood, who was associated with Robert Logan of Cleveland in designing this steamer, says of a short trial of the boat which took place recently:

"We ran the Majestic for a mile by the log at ninety-six revolutions, or 576 feet piston speed per minute, at which her speed indicated on the log is 13.55. Capt. Campbell says these are knots, but I am afraid that would make her rather speedy, without mentioning a slight suspicion of negative slip, her propeller being 15 feet 6 inches pitch. The engines worked beautifully, without a sign of heating, and the boilers are amply large enough."

Dimensions of the Majestic are: Length over all, 223.6 feet; length of keel, 208 feet; extreme beam, 35 feet; depth of hold, 12 feet; between decks, 8 feet 5 inches. Cabins are all fore-and-aft on the upper deck. Engines were built by J. Inglis & Sons of Toronto, and are of the fore and-aft compound type, with cylinders 28 and 54 inches by 36 inches stroke.

About eighty-four lifts were made with the hydraulic jacks before the steamer Alva was floated off North Manitou island. This process of lifting a stranded boat a few inches and then moving her as far as the lift will permit by pulling with a tug—the operation being repeated over and over again—is tedious and difficult, but in the case of the Alva the wreckers were successful after about forty-eight hours of favorable weather. The increased weight of about 500 tons of water, which could not be pumped from the damaged compartments of the boat, made the work more difficult than it would have been if the water bottom could have been entirely freed of its contents. The wrecking steamer Favorite, which was engaged on this job, has ten hydraulic jacks of about eighty tons lifting capacity each, and it is understood that her equipment in this line is to be increased for future emergencies. The fact that the boat is equipped with a search light, as well as extensive lighting apparatus otherwise, permitted of work by night, and the ready release of the steamer, with much less expense than was expected, was due largely to operations being carried on night and day.

Valkyria III., the British yacht which is to compete for the America's cup, is to have a steel main mast covered on the outside with wood.

## Didymus Again on Deck.

In a short item relative to fuel tests made recently on the lake passenger steamer North West, the REVIEW referred to difficulty encountered in cleaning fires when hard coal was used. It was noted that the surplus boiler power in the North West, although quite large, was not sufficient to cope with the delay encountered when, in cleaning hard coal fires under three boilers at a time, a full hour was lost with that number of boilers. As a result of this simple statement of fact, the dyspeptic editor of the Engineer, of New York, whose bark is worse than his bite, and who watches with a jealous eye the publication of any engineering information in the REVIEW, lest the freshness and fulness of such information be the means of his losing a subscriber, jumps from his editorial kennel to tear the REVIEW to pieces. It seems queer that he will never learn that he is chained and that when he goes after the REVIEW he always comes to the end of his chain, turns a painful somersault and after making a spectacle of himself and gaining the laughter of engineers on the lakes, goes back and whines about the good old days of 40 pounds pressure and non-condensing engines. He can not realize that he is a "used to be" and that the REVIEW is an "is now." Like a bull on the railroad track, he stands bellowing at the Empire State express progress that the REVIEW is making. There was a time when Father Watson controlled the apple orchard of the marine engineers' association in this country, but marine engineering information has always been free to all who cared to take the trouble to gather it. Several years ago the engineers concluded that they did not need a watch dog to chew up owners and the men who employed them. He was let loose. He barked and threatened to chew up the association—or its secretary, rather. Last winter, considering the harmlessness of his barks, he was permitted to return to the association. The first thing he did was to almost precipitate a quarrel between lake engineers and owners, by talking of matters of which he had no knowledge, and which were settled in short order by the cool-headed president of the association.

Mr. Watson is a great harpist, and his harp has two strings. One is the mistakes of daily newspaper reporters, but as nobody seems to mind this he ought to be allowed to dwell on it. It hurts no one and tickles the harpist immensely. The other string is not, however, so harmless. Its vibrations are about strikes and abuse of employers; grumbling and complaining articles that misrepresent the engineers as a class, and constant reference to engineers not being paid well enough for their services. Very few men are well enough paid, but Harper Watson is lowering the standing of engineers with vessel owners (if any of them ever read the Engineer) by holding them up as a body of men entirely dissatisfied with their position. If the association could steal the Engineer's harp long enough to take out this string, and let his censorship of the daily press go on, they would find themselves in better repute with the men whose confidence and respect is of most value to them.

Mr. Watson says he never knew of any one cleaning fire in three boilers at a time. That may be true, for it is doubtful if he was ever engineer of a boat that had three boilers. Now for his information we will say that the North West has Belleville boilers, twenty-eight of them. It is quite probable that Mr. Watson has never seen a Belleville boiler. Read up Engineering and the REVIEW, Mr. Watson, and learn something of these water tube boilers, or come out here on the lakes and we will treat you well and show you how they could clean three boilers at a time and still have twenty-five in use at a working pressure of more than 200 pounds. If they cleaned only one at a time they might be several days at the job. This would hardly meet requirements in a 20-mile boat like the North West, as it is necessary almost to clean fires throughout the entire installment of twenty-eight boilers on every watch. Be cheerful. Don't look on the dark side of things so much. Respect is due to gray hairs. We expect to have some ourselves some day, but if we are going to be continually growling and disputing things that we know nothing of, we will be satisfied to take our departure before those characteristics come, if they are adjuncts to the hoary head.

Gen. Asa S. Bushnell, Republican candidate for governor of Ohio, was aboard the steamer North Land on Thursday last when she was dedicated by the Cleveland Chamber of Commerce. In writing the REVIEW for a photograph of the boat he says: "The North Land is a splendid steamer, and the occasion was one of so much pleasure I shall be glad to have a souvenir of it."



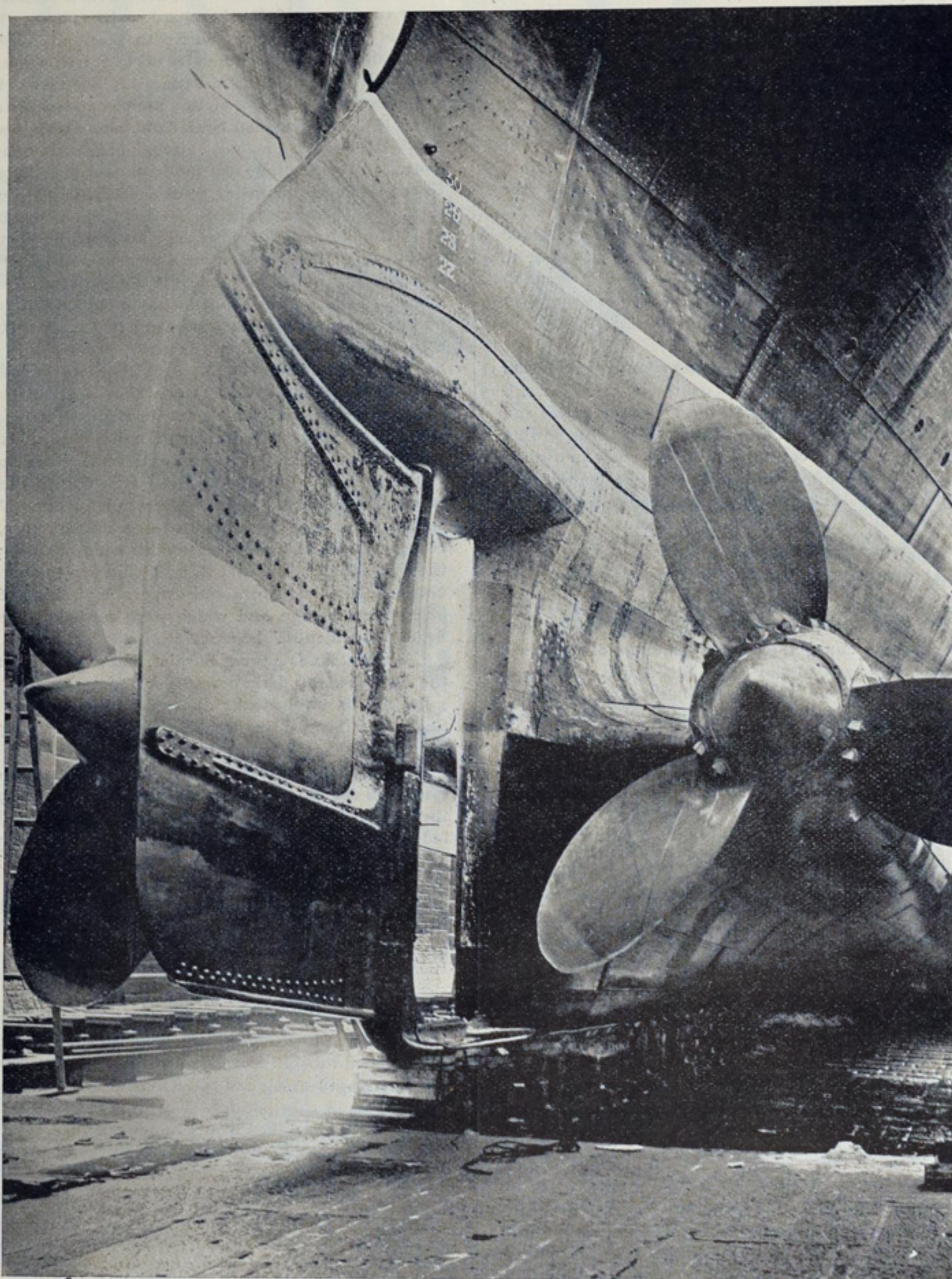
### In General.

One gross ton of salt water occupies 35 cubic feet and one gross ton of fresh water 36 cubic feet, there being a difference of one cubic foot per ton in the density of salt and fresh water.

The summer meeting of the Institute of Naval Architects, the greatest of all associations of ship builders, is now being held in Paris. Only a few papers are to be presented but they are all on subjects of great importance, and have been prepared by some of the most distinguished members of the organization.

The Western Society of Engineers, Chicago, will extend the courtesy of one of their rooms to Lehigh University on June 21, 22 and 23, in which to hold its local examinations for admission to the freshman class. The examinations will be under the direction of Mr. H. F. J. Porter, western representative of the Bethlehem Iron Company.

A small vessel engaged in government contract work on the Mississippi is named Gen. O. M. Poe. It would be in order to name one of the large lake freighters for the General before he severs his connection with the big river and harbor projects on the lakes, which are among the greatest engineering works ever undertaken in this country.



STERN VIEW SHOWING TWIN SCREWS OF BIG CUNARD LINER CAMPANIA.

It is probable that there will be no report of speed from the new American line steamer St. Louis until she returns to New York about the middle of the month after her first Atlantic voyage. On the builders' trial of sixty hours before leaving New York she is said to have attained 20 knots without difficulty.

A test piece of armor plate, weighing  $24\frac{1}{2}$  tons, has been shipped by the Bethlehem Iron Company of South Bethlehem, Pa., to officers of the Russian government at St. Petersburg. This constitutes the first shipment on the armor plate contract made by the Bethlehem company with Russia a short time ago.

At the annual meeting of the William Cramp & Sons Ship & Engine Building Co., held in Philadelphia a few days ago, Vice-President Benjamin Brewster of New York, who is going abroad, declined a re-election, and Messrs. William M., Samuel H. and Jacob C. Cramp also retired from the board, their successors being Messrs. Wm. H. Barnes, Samuel Dickson, Richard C. Dale and George S. Graham. The three brothers who retired from the board were paid officers of the company and their contracts have expired. There is said to be no change in ownership. Charles H. Cramp and Henry W. Cramp continue as directors. The former is president of the company and the latter secretary and treasurer. Edwin S. Cramp is the superintending engineer.



### Strange Accident in Loading a Steamer.

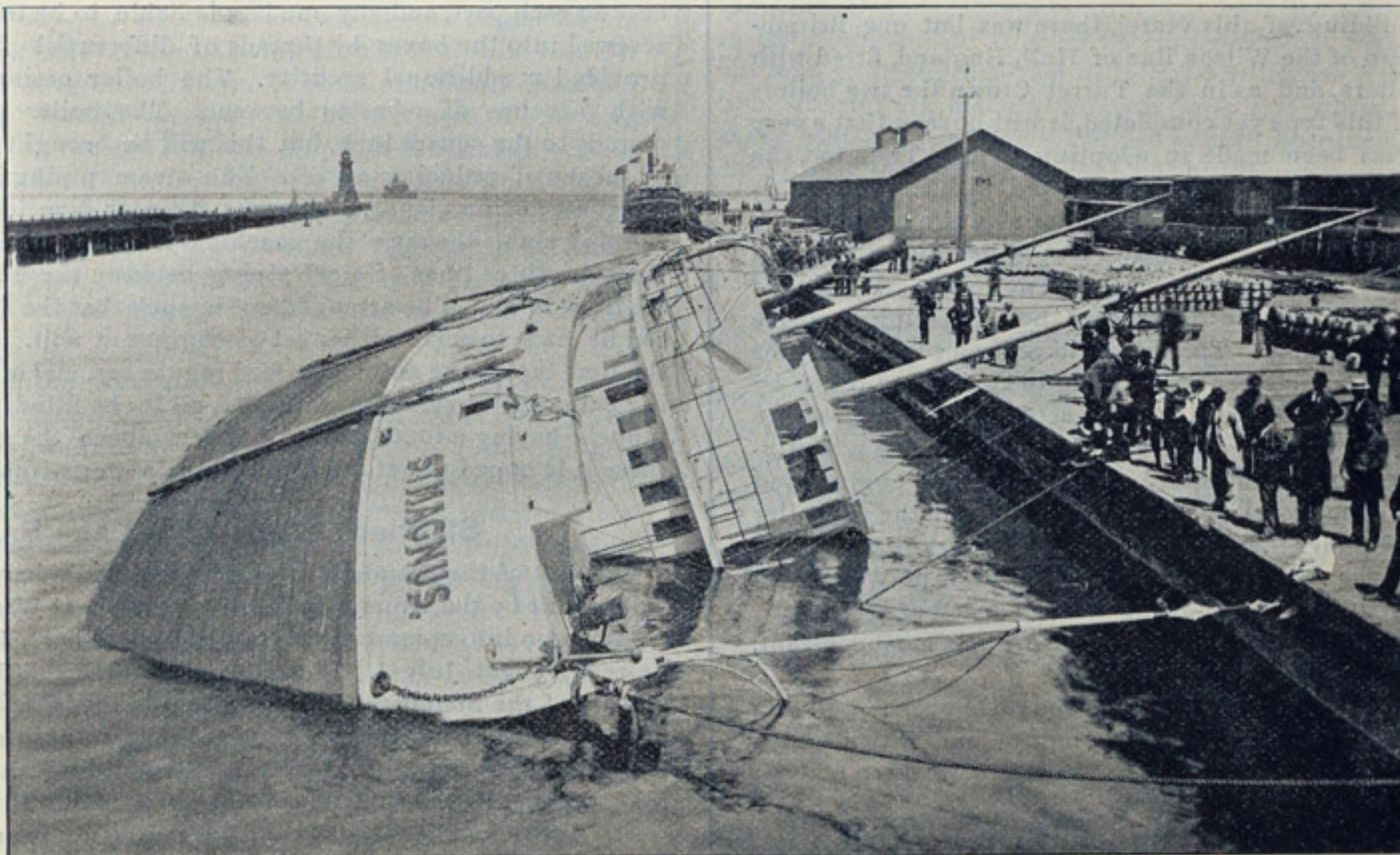
The engraving printed herewith shows the Canadian steamer *St. Magnus*, a passenger and freight vessel of about 800 tons capacity, as she now lies sunk in the main river at Cleveland, about 2,000 feet from the harbor entrance. The accident that resulted in the sinking of the vessel was of a very strange kind. She is one of four vessels comprising the Merchants' Montreal line, but is owned by R. O. and A. B. McKay of Hamilton, Ont. After loading about 14,000 bushels of grain at Toledo, she came to Cleveland on Thursday last to take on 100 tons of pig iron and 100 tons of wire. As will be noted by the engraving, the vessel was pointed up stream and the pig iron and wire was being loaded from her port side when the accident occurred. Upon being tied to the dock it was noticed that she was listed somewhat to starboard, and on this account the iron was placed largely on the port side of the ship with a view to putting her on an even keel. It would seem strange, of course, that this should be done with no apparent cause for a list in the vessel, but such was the case, however, and the loading continued until suddenly the list to starboard disappeared and the vessel rolled over to port, her masts and smokestack striking the dock. She filled rapidly and settled on the bottom of the river in 18 feet of water.

The sinking of the vessel was, of course, caused by the manner in which she was loaded. The list to starboard when she was first tied to the dock was undoubtedly due to some obstruction at the bottom of the

inches. When the lake level is at a low point and the channel is taking but 300,000 cubic feet a minute—the minimum capacity—the reduction will be but a fraction over one inch. The report says further with reference to a curve drawn on a diagram submitted in connection with it:

"This curve indicates what is highly probable and in conformity with the increasing slope, viz., that at low stages of Lake Erie the change of level for a change of outflow amounting to 10,000 cubic feet per second is about 3 inches, or about  $1\frac{1}{2}$  inches for the amount which will for some years at least be taken by the Chicago drainage canal. At midstage of the lake it appears that the change of level will be somewhat more, but the change is not of so much consequence at the higher as at the lower stages. \* \* \* The change of level in Lake Erie is fixed by Niagara river. The rise and fall of Lakes Huron and Erie are about the same, and therefore a change of flow through the connecting rivers will produce the same change of level in both lakes, except in so far as the flow through Niagara river is larger than the flow through the Detroit river. That is, the change of level in Huron and Michigan for a given change of flow will be 15 per cent. more or less greater than the change in Erie."

Referring to Major Ruffner's conclusions regarding the Niagara outflow, the report says: "Major Ruffner and his commission, when they examined Niagara river and made their measurements, used a side channel gauge. When this gauge measured a flow of a little less than zero they found that the flow was 164,000 cubic feet a second. When the gauge marked one foot the discharge increased to 204,000 cubic feet in a second,



TURNED TURTLE AT THE DOCK—SUNKEN CANADIAN STEAMER ST. MAGNUS.

river, from which she was moved off later, or to her fender strake being caught on some projection extending out from the side of the dock. It is probable that the movement of the water in the channel, caused by passing tugs and other vessels, caused the *St. Magnus* to release herself from the temporary support, whatever it may have been, on her port side, and with the pig iron and wire all loaded on that side she turned over in short order. Divers are now engaged in work preparatory to raising the vessel. The photograph and cut were made by the General Engraving Co., Cleveland, O.

### Report on the Lake Levels Question from Drainage Canal Officials.

In all the discussion that has appeared of late regarding the effect of the Chicago drainage canal on lake levels, nothing has been heard from the engineers in charge of the big project, although it is well known that some of the best talent to be found among civil engineers in this country is engaged on the work. It is understood now, however, that the canal trustees are about to submit a lengthy statement covering the subject to the secretary of war, and extracts from a report prepared by Thomas T. Johnson, who is assistant chief engineer in charge of the hydraulic work of the canal, have been given out.

Mr. Johnson finds that when Lake Michigan's level is at its highest normal point and the drainage canal is taking from the lake its maximum capacity of 600,000 cubic feet of water a minute, or 10,000 a second, the reduction of the level will be between 5 and 6 inches. At its average level, year in and year out, the reduction of the level will not exceed  $3\frac{1}{2}$

and a further measurement at 2 feet indicated a discharge of 228,000 cubic feet in a second. It will be noted that the change in flow from the measurement at zero to that at one foot was 40,000 cubic feet. This corresponds to a one-foot change of level in Niagara river, and a change in the level of the lake which would correspond to that would be 20 per cent. more, or  $14\frac{1}{2}$  inches. But the flow of the drainage channel from the lake is to be now but 300,000 cubic feet in a minute, or 5,000 a second. Therefore 40,000 cubic feet increase in flow producing a lake level change of  $14\frac{1}{2}$  inches would make a 5,000 cubic foot flow a second produce a change of but one and three-quarter inches. If the flow is to be 600,000 cubic feet a minute then the change in the lake level would be double that."

Any one contemplating a trip to the seashore this summer can get any of the following books by sending a two-cent stamp to A. C. Kendall, general passenger agent of the Old Colony line and the New York, New Haven & Hartford Railroad, Boston, Mass.: "Manual of Old Colony Summer Resorts," "Quaint Cape Cod and its Summer Delights," "Handbook of Newport," "Berkshire and Litchfield Hills," "Martha's Vineyard," "Nantucket," "What to See at Plymouth," and "Manual of Summer Resorts on the New Haven Systems."

For the conference of the Epworth League at Chattanooga, Tenn., June 27th to 30th, the Nickel Plate road offers one fare excursion tickets. June 25—267

Enclose a stamp to any agent of the Nickel Plate road for an elaborately illustrated art souvenir entitled "Summer Outings." Aug. 31—264



### Tubulous Boilers Going into Merchant Steamers.

As might be expected, some of the builders of merchant ships in England and Scotland are following the example set by the British admiralty in adopting tubulous boilers for large freight and passenger vessels, and reports of trials of vessels thus equipped are coming to hand. In this country, also, builders are taking to these boilers for large vessels, and among the latest announcements in this regard, is one to the effect that the Babcock & Wilcox Co. has made arrangements to place their type of marine water tube boiler in the large freight and passenger steamer to be built at Newport News, Va., for the Plant line of New York. This vessel was described in the REVIEW of May 16 and is intended for service on the Atlantic and Gulf coasts.

English engineering publications just received give accounts of the trial of a freight vessel of the turret type, which is fitted with Babcock & Wilcox boilers. These turret steamers are of a type invented by William Doxford & Sons of Sunderland, England, shortly after the whaleback was brought out in this country. They have been described in the REVIEW. Ten of them are now in commission and they have been operated successfully in various lines of ocean freight service. The boat that has just been fitted with tubulous boilers is named Turret Crown. She was built to carry 3,150 tons on 18 feet draft, and is 253 feet between perpendiculars 44 feet moulded breadth and 21 feet 9 inches moulded depth. The engines are placed aft and are of the triple expansion type, the cylinders being respectively, 21½ inches, 36 inches, and 59 inches diameter, and 39 inches stroke.

Previous to the building of this vessel, there was but one British-owned steamer, the Nero of the Wilson line of Hull, England, fitted with Babcock & Wilcox boilers, and as in the Turret Crown the two boilers fitted are the largest of this type yet completed, it will be seen that a very important departure has been made in adopting them. Then too, the ship, built to carry a large cargo on light draft, and with engines aft, is similar to the type of freight carrier that is common on the lakes. Each of the Turret Crown's boilers has 2,292 square feet of heating surface and 55 feet of grate area, thus giving a ratio of forty-two to one. In each of the boilers there are three furnace doors, each boiler having a single furnace and combustion chamber. The boilers have been constructed for a working pressure of 200 pounds per square inch, and have been tested by hydraulic pressure to 400 pounds, although in actual work the pressure is only 180 pounds. The principal feature of the trial trip was a continuous run of three hours, to test the speed of the vessel and engines and the coal consumption. The vessel was in ballast trim and the propeller not fully immersed, and under these conditions the horse power was approximately 1,300, and the coal consumption on the basis of Welsh coal was 1¼ pounds per hour, the log showing a mean speed of 11¾ knots. There was an ample supply of steam, and the pressure was most constant, while the stokehole was comparatively cool.

A second vessel for the Wilson line, referred to above, as well as a steamer that is to have quadruple expansion engines, and which is also being built by William Doxford & Son, are to be fitted with these boilers.

### Big Engines and Tubulous Boilers in the Terrible.

The first of the so-called protected cruisers, for which the British government has adopted Belleville water tube boilers, was launched on the Clyde a few days ago. The vessel is the Terrible and she is 500 feet between perpendiculars, 538 feet over all, 71 feet breadth and 43 feet 4 inches depth to the upper deck. The displacement at the load draft of 27 feet is 14,250 tons. This vessel has no less than forty-eight boilers of the tubulous type.

The twin engines of the Terrible are of the vertical, triple expansion type, with four cranks, there being two low pressure cylinders. The diameter of high pressure cylinder is 45 inches and the intermediate 70 inches, the two low pressure cylinders being each 76 inches, and the stroke 4 feet. An excellent arrangement of standards has been adopted, the engines possessing the advantage of being very open and accessible, with efficient and ample rubbing surface for the guides. There are four cast-steel standards to each cylinder, two back and two front. The cross-head is of considerable length, the guides being at each end, both back and front. In this way the cranks are quite exposed, and the cross girders in the engine bed for taking main bearings are conveniently placed between the standards. The low pressure and intermediate pressure valves are of the ordinary flat type, with an arrangement for relieving the pressure at the back. The high pressure valve is of the piston type. The link motion and the reversing gear are of the usual description. There are two air pumps to each set of engines, both worked by side levers, one from the high pressure cylinder and the other from the forward low pressure cylinder. The receiver pipes are of steel with gun metal expansion joints. The thrust-block has eight adjustable collars, with white metal. The shafting is hollow steel, being 20 inches diameter. The stern shafts are covered entirely with brass. There are two main condensers of the cylindrical type, having a combined cooling surface of 25,000 square feet. There are also two auxiliary condensers, the combined surface of

these being 3,000 square feet. There are four 24-inch centrifugal pumps for the main condensers, and the two 9-inch auxiliary centrifugals, with air pumps, for the auxiliary condensers. There are three feed pumps in each engine room, or six in all. There are also six pumps of the same type in the stokeholds.

The ship has forty-eight boilers, these being all of the Belleville water-tube type. They are situated in eight compartments, four of which contain eight boilers each, and the four others four boilers each. There are, in addition to the stokehold pumps already mentioned, eight sets of air-compressors. These form an essential feature in the Belleville system of steam generation, as they are used for forcing air, through suitable nozzles placed above the fire doors, into the interior space of the boiler. The object is to promote combustion, not only by the admission of fresh air, but by securing a thorough mixture of the gases; whilst, at the same time, the flame is spread over the heating surface so as to reach all parts. Baffle plates of sheet steel are also placed amongst the tubes to secure the same end. The Terrible's boilers are equally divided in number between the eight element and seven element arrangement. The collective grate service is 2,200 square feet, and the total heating surface 67,800 square feet. The tubes are of lap-welded steel 4½ inches external diameter and about 6 feet 8 inches long. The total length of pipe in an element is 120 feet. The boxes into which they are screwed are of cast iron, carefully annealed, or what is generally known as "malleable cast." The thickness is 5-16 inches. A great deal of care has been taken to make sure that these malleable castings are trustworthy. A test piece is cast on each part, and any one box is liable to be tested. The tubes are screwed into the boxes by threads of differential pitch, jam nuts being provided as additional security. The boiler casings are of sheet steel with 3 inches of asbestos between. The boiler pressure will be 260 pounds to the square inch, but this will be brought down to 210 pounds by means of reducing valves. The steam piping is of steel with gun-metal expansion glands. There is a center line longitudinal bulkhead running right through the machinery space, and on each side of this there are three lines of steel piping between the boilers and engines, or six lines in all. The arrangement is such that the boilers on either side can be made to serve either set of engines at will. The steam separator, the lime tanks, the automatic feed regulators, and other parts essential to the Belleville system are, naturally, all to be fitted. There will be four funnels having a total height of 80 feet above the grate bars, and with these it is hoped to get the 25,000 horse power without forced draught.

### Standard Company's Lake Barges.

The first of the Standard Oil Co.'s steel tank barges, S. O. Co. No. 75, being built by the American Steel Barge Co. at West Superior, is now ready to go into commission, and the second boat, S. O. Co. No. 76, will be ready about July 1. It can be said on the authority of one of the officers of the Standard company that it is the intention now to run both of these boats from the Whiting refinery to points on Lake Superior, mainly to West Superior, where the Standard will have about 50,000 barrels tankage, for the distribution of its products throughout the north-west. Provisions for loading and unloading are nearly completed at both Whiting and Superior, and will, no doubt, be completed by the time the boats are ready for service. No contracts have been made with any steamship line for towing the boats. Advantage will be taken of any steamers that may be available as the boats are ready to move from port to port. It is still the intention of the company to take these boats to the coast for winter service, where they will no doubt be required in addition to the vessels which the Standard already has in service there. R. C. Veit, No. 26 Broadway, New York, is manager of the shipping and lighterage department of the Standard, and matters pertaining to the construction and management of these vessels are under his direction.

### Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store at the principal points of accumulation on the lakes on June 8, 1895:

	Wheat, bushels.	Corn, bushels.
Chicago .....	18,034,000	5,842,000
Duluth .....	9,200,000	.....
Milwaukee.....	289,000	.....
Detroit.....	341,000	149,000
Toledo .....	258,000	349,000
Buffalo .....	1,453,000	710,000
Total.....	29,575,000	7,050,000

The Nickel Plate road has published a map of Boston, Mass., showing the location of the Christian Endeavor convention hall and state headquarters of the 14th international convention, July 10th to 15th, and presenting the merits of the company's through drawing room sleeping car line between Chicago and Boston. Write for a copy to any agent of the Nickel Plate road, or B. F. Horner, general passenger agent. July 5—266



### Secretary Keep's Estimates—Important Calculations.

Major E. H. Ruffner of Buffalo, member of the army engineer corps, a short time ago requested Secretary Keep of the Lake Carriers' Association to prepare an estimate of the decrease in capacity of the lake fleet caused by a fall of 3, 6 or 9 inches in the mean level of the lakes. Major Ruffner is a member of the commission appointed by the secretary of war recently to investigate and report upon the probable effect of the Chicago drainage canal on lake levels. Mr. Keep's conclusions are contained in the following letter:

Major E. H. Ruffner, United States Engineer, Buffalo, N. Y. Sir:—I send you herewith, in accordance with your request sent to me early in the past month, a statement showing the estimated decrease in the carrying capacity of the lake fleet caused by a fall of 3, 6, or 9 inches in the mean level of the lakes. Of course, it is impossible to get exact results in making such an estimate. The value of the results obtained depends upon the reasonableness of the method followed in making the estimate. I, therefore, will outline briefly to you the method which I have followed.

I have taken the latest Inland Lloyd's Register, containing a list of the vessels on the great lakes engaged in the carrying trade and of sufficient importance to be classed for insurance. I have assumed that all the other vessels on the great lakes, except those in the Inland Lloyd's Register, are too small to have their carrying capacity affected by a lowering of the lake levels within the limits above mentioned. I have also thrown out all steamers and schooners in the Inland Lloyd's Register below 250 net registered tons, and a considerable number of larger vessels which I knew to be of light draught, not using all the available water in the ports and channels navigated by them. I have practically confined my estimate therefore to vessels engaged in the business of carrying package freight, grain, coal, ore and lumber. Many of the lumber vessels included in my estimate are of comparatively light draught, but I am informed by men familiar with the lumber traffic that these vessels can and do draw all the water that is available at most of the lumber loading ports. Their carrying capacity would therefore be affected by a lowering of the lake levels just as much as the deeper draught vessels which frequent harbors of greater depth.

Having thus selected the vessels whose carrying capacity would be affected by a lowering of the lake levels, I have thrown them into eleven different classes according to size and carrying capacity. I have looked up the records of a number of boats which are fair types of each class, in order to ascertain just what cargoes they carry at different draughts. In each case I have examined sufficient records of each such boat at varying draughts to satisfy myself as to the true estimate for the carrying capacity of that vessel when deeply immersed for each additional inch of loading. From these data it was an easy matter to find out how much the carrying capacity of the entire lake fleet would be decreased in the case of a single load for each vessel by a fall in the lake levels of 3, 6 or 9 inches. To ascertain the diminished carrying capacity for a season it was necessary to estimate the number of full loads carried during the season by steamers and barges. This is a very difficult matter, but I have estimated it as follows: Twenty five loads per season for steamers and fifteen loads per season for schooners. This will probably seem a low estimate, but allowance must be made for partial loads and for a very large number of craft which run light in one direction. I find, too, that according to my table, the total carrying capacity of the lake fleet for a single load is such that 25 loads for steamers and fifteen loads for schooners means about 33,000,000 tons of freight carried in a season. The detailed figures made by the bureau of statistics for the traffic of 1890, and the known facts with regard to increase of traffic since that date, lead me to believe that this is just about the amount of freight carried in the United States foreign and coastwise trade on the great lakes; so that I am led to believe that my estimate of number of cargoes carried by each class of vessel can not be far out of the way. Upon this basis I find the following results:

A lowering of the lake levels by 3 inches would produce a diminution of the carrying capacity of the lake fleet in a season amounting to 1,142,370 tons; a lowering of the lake levels by 6 inches would diminish the carrying capacity 2,284,740 tons; and a lowering of the lake levels amounting to 9 inches would diminish the carrying capacity 3,427,110 tons. Turning these results into dollars and cents, and estimating the earnings of lake vessels at an average of 50 cents per ton of cargo carried, over and above cost of loading and unloading, a lowering of 3 inches would diminish the earnings of the fleet in a single year \$571,185.00; a lowering of 6 inches would diminish the earnings \$1,142,370.00; and a lowering of 9 inches would diminish the earnings \$1,713,555.00.

You will notice that I estimate the diminution in carrying capacity for a 9-inch fall in the lake levels at exactly three times the diminution caused by a 3-inch fall. While there is a difference between the number of tons of cargo which will immerse a lake vessel one inch at the beginning of her loading and the number of tons that will be required to immerse her one inch at the end of the process, the construction of lake vessels is such that during the last part of loading the capacity of the vessel per inch is practically constant. It is fair also to call to mind the

fact which you already well know, that the growth of traffic on the great lakes is all in the direction of the deep-water business carried in the largest type of vessels. The change which is going on in the lake fleet is extremely rapid, the smaller vessels disappearing and the larger vessels taking their place. The process and the natural growth of the traffic will tend to greatly increase the effect of a fall in the lake levels on carrying capacity as time goes on. My estimate does not include Canadian vessels.

C. H. KEEP,

Secretary Lake Carriers' Association,

Buffalo, N. Y., June 4, 1895.

### From a New York Underwriter.

Editor MARINE REVIEW: We have read with much pleasure your editorial paragraph on the recent damages to the steamers German, Corona and Alva, as it is the first intimation we had received from any lake source that there was anything unusual, or requiring any comment whatever, in the daily reports of groundings we have been reading since the opening of navigation, and the consequent extraordinary large bottom damage received by the steel steamers, which have, as you say, been insured at very low rates. It is not only extraordinary, to our minds, that the number of these groundings should be so large, but that repairs costing from \$10,000 to \$20,000 should be necessary, in almost every case, from having "simply struck bottom in Poverty passage." We have understood that the ship builders and owners of the lakes, in the light of their experience with light built ships, have made marked improvements in construction, but it must be confessed that these developments do not tend to strengthen that belief. To outsiders it must seem that bottoms are not yet made sufficiently strong to withstand the very rough usage they are receiving. We had indeed been informed that some recently built steamers have cellular bottoms with very light angle frames in between the longitudinals, a form of construction that does not possess local strength and would lead to damages, in case of grounding, much greater than a properly constructed vessel would receive.

With the season of navigation barely opened, the volume of losses has reached enormous proportions and, as you point out, if this record is kept up for the remainder of the season, it certainly would lead to increased rates next year, and also to a more careful scrutiny of the vessels offered. We trust, now that you have called attention to the serious nature of the situation, that ship owners and builders will unite in taking measures to restore the confidence of underwriters in the steel lake steamers they have done so much to encourage. We might add that with the opening of navigation next year the 20-foot channel will be completed, and a new condition must be met. If vessels are not sufficiently strongly constructed to meet existing conditions, what will happen to them when brought down to the 20-foot draft?

We are aware that a number of vessels, now under construction, are building with a great increase in bottom strength over previous structures, especially in order to fit them to take advantage of the increased draft in the future, and we are strongly of the opinion that the underwriters owe it to themselves to demand that vessels built hereafter be brought up to this standard, if present favorable terms of insurance are to be continued.

UNDERWRITER.

New York, June 7, 1895.

### Unique's Time.

Editor MARINE REVIEW:—I note the comments of "A Passenger" in your issue of May 30; also that he awaits with interest my list. I take it he refers to boats that can beat the so-called record of the Unique. In reply I will say that when "A Passenger" throws off his nom de plume, comes out like a man and signs his name, I can then better make reply to some of the distances and fast time he claims some one has given him. In my communication of May 23, the corrected distance from Windmill point to Woodward avenue should read 6¾ miles, (as per my letter,) and not 6¼ miles as published.

Detroit, Mich., June 8, 1895.

J. W. WESTCOTT.

### St. Mary's River Buoys.

Editor MARINE REVIEW:—Referring to the location opposite Sweat's mill on the Sault river, where the consorts of the steam barge Shenandoah grounded a few days ago, it may be well to note that there is a mud shoal at this point, which has already cost the vessels interests \$100,000. There is no red stake at this point, and the black stake is shifted nearly 6,000 feet out of position, down the channel.

T. R. HARVEY.

Sault Ste. Marie, Mich., June 5, 1895.

The Nickel Plate road has compiled a list of country homes along the south shore of Lake Erie, willing to accommodate summer boarders, and a copy will be mailed to any address by enclosing a stamp to any agent of the Nickel Plate road, or to B. F. Horner, general passenger agent. Aug. 31—265





DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 516 Perry-Payne building, Cleveland, O

SUBSCRIPTION—\$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, 75 cents. Advertising rates on application.

The books of the United States treasury department contain the names of 3,341 vessels, of 1,227,400.72 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons and over that amount on the lakes on June 30, 1894, was 359 and their aggregate gross tonnage 634,467.84; the number of vessels of this class owned in all other parts of the country on the same date was 316 and their tonnage 642,642.50, so that half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1894, was as follows:

Class.	Number.	Gross Tonnage.
Steam vessels.....	1,731	843,239.65
Sailing vessels.....	1,139	302,985.31
Canal boats.....	386	41,961.25
Barges.....	85	39,214.51
<b>Total.....</b>	<b>3,341</b>	<b>1,227,400.72</b>

The gross registered tonnage of vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

	Number.	Net Tonnage.
Year ending June 30, 1890.....	218	108,515.00
" " " 1891.....	204	111,856.45
" " " 1892.....	169	45,168.98
" " " 1893.....	175	99,271.24
" " " 1894.....	106	41,984.61
<b>Total.....</b>	<b>872</b>	<b>406,976.28</b>

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.  
(From Official Reports of Canal Officers.)

	St. Mary's Falls Canal.			Suez Canal.		
	1894.	1893.	1892.	1894.	1893.	1892.
No. vessel pass'ges	14,491	12,008	12,580	3,352	3,341	3,559
T'n'ge, net registd	13,110,366	9,849,754	10,647,203	8,039,106	7,659,068	7,712,028
Days of Navigat'n	234	219	223	365	365	365

Entered at Cleveland Post Office as Second-class Mail Matter.

IN ACCORDANCE with a request from Major E. H. Ruffner of Buffalo, one of the United States army engineers forming the commission appointed by the secretary of war to investigate and report upon the probable effect on lake levels resulting from the opening of the Chicago drainage canal, Secretary Keep of the Lake Carriers' Association has prepared some important and interesting estimates in connection with the relation of the canal question to the carrying capacity of lake vessels. The answer to Major Ruffner appears on page 9 of this issue. Mr. Keep estimates that a lowering of the lake levels by three inches would produce a diminution of the carrying capacity of the lake fleet in a season amounting to 1,142,370 tons; a lowering of six inches would diminish the capacity 2,284,740 tons; and a lowering of nine inches would diminish the capacity 3,427,110 tons. Turning these results into dollars and cents, and estimating the earnings of lake vessels at an average of 50 cents per ton of cargo carried, over and above cost of loading and unloading, he concludes that a lowering of three inches would diminish the earnings of the fleet in a single year \$571,185; a lowering of six inches would diminish the earnings \$1,142,370; and a lowering of nine inches would diminish the earnings \$1,713,555.

Upon receipt of these estimates, Major Ruffner is reported to have said that the vessel owners could better afford to pay the expense of bringing over the Berlin engineers and have the sewage of Chicago taken care of as is that of Berlin. By this it may be inferred that it would be cheaper, as well as better, to have Chicago sewage taken out into the prairie and purified by irrigating the soil than to take from the lakes sufficient water to carry it towards the Mississippi. But Major Ruffner's opinions are so decided in opposition to the canal that it would not be surprising if his confidence, as a result of conclusions based on his own figures regarding the Niagara river outflow, would injure any report that may be made by the army-engineer commission, of which he is a member, and which was recently appointed to investigate the canal question. The figures presented by Secretary Keep are certainly indicative of a great loss to the vessel interests if the canal should result in a lowering of even 3 inches in lake levels, but the Chicago engineers try to prove, in a statement also published on another page, that the flow of water necessary for the canal as now planned can not possibly result in a reduction

of more than an inch and a fraction in the water levels, and thus the question still rests with the two factions of engineers. It is doubtful, also, whether definite action of any kind will be taken by the government as a result of any report that may be made by the army engineers.

It may be well to again note here, on account of telegrams that have been published throughout the country, that there is evidently no intention of using the canal as at present planned for commercial purposes. There is nothing new in the announcement that solid bridges are to be built over the channel. According to the project now being carried out, this waterway is to be simply a sewer for the city of Chicago, and it is not at all probable that the larger scheme for extensions forming a ship canal to the Mississippi will be carried out during the life of the present generation.

A NEW YORK underwriter, writing the REVIEW about losses on the lakes since the opening of navigation, says that officers of some of the companies that have gone into the business this season are becoming alarmed, especially on account of the great number of strandings, involving heavy losses on steel vessels. It is intimated that bottoms are not constructed strong enough. This may be true, and the losses from strandings have undoubtedly been very heavy, so that vessel owners will do well to meet the requirements of underwriters as far as possible in water bottoms of new vessels. But the losses aside from strandings have hardly been sufficient as yet to cause a general return to high insurance rates next season. Only two steel vessels have been lost, both in collision. This is hardly enough to cause loud complaint from the underwriters.

IN THE Canadian house of commons a few days ago it was announced that the marine department of the government is not disposed to change such portions of the navigation laws for the lakes as would bring the Canadian regulations in conformity with the White law adopted by congress last winter. This means that Canadian lake steamers without a tow will blow a single blast of the whistle for a fog signal, while vessels of the United States on the lakes will blow three blasts for a fog signal whether towing or not. This is the most important difference in the regulations. Accidents may arise from it.

JAMES J. HILL of Great Northern railway fame is now considering plans for introducing flour into China. He is encouraging all schemes that will develop a big Pacific steamship business in connection with his northwestern railway interests. His idea is to carry flour so as to sell it in China at 1½ cents a pound, and bring return cargoes of rice so as to supply the markets here with that article of food at the same price.

It very often happens in letting government contracts, that the lowest bidder declines to enter the formal contract, on the ground that mistakes have been made in transcribing the estimate upon which the bid was based. In such cases requests are often made to award the contract to the next lowest bidder and charge the difference to the party making the mistake. The navy department asked the attorney general, recently, for a ruling in a case of this kind. The attorney general answered that the practice could not be permitted. The mistake, he said, was not a mutual one but was due to negligence on the part of the bidder who sought to be released from the contract.

French photographers are making progress with an apparatus by means of which photographs have been taken under water. The device consists substantially of a barrel filled with oxygen, surmounted by a glass bell which holds an alcohol lamp. By means of a mechanical contrivance, powdered magnesium is thrown on the flame of the lamp, which flares whenever a view is taken. The equilibrium of the barrel is preserved by means of suitable vents in the bottom which admit water as the oxygen diminishes.

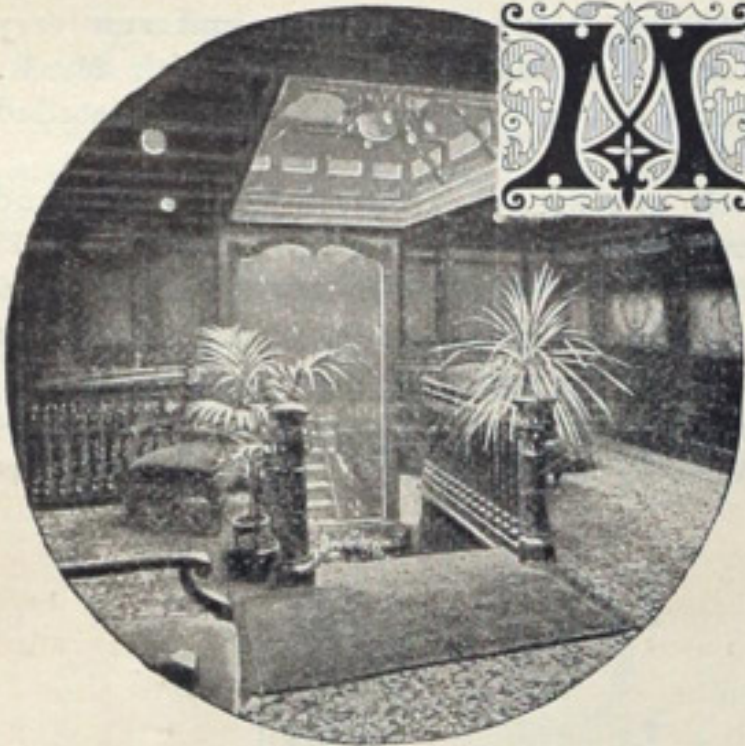
Superintendent Bristow of the Cleveland Ship Building Co. has promised Mr. R. R. Rhodes that he will have the big freight steamer Yale ready for launching on July 20, and everybody interested in the boat is satisfied that the promise will be fulfilled. There is some question about the boat being far enough advanced to launch on that date, but two of the owners who have confidence in Mr. Bristow have backed up their opinions with wagers of silk hats and new suits.

A FULL DESCRIPTION OF THE NORTH WEST, SISTERSHIP OF THE NORTH LAND, WAS PUBLISHED IN THE EDITION OF THE REVIEW, JUNE 30, 1894, CONTAINING FIFTY-TWO PAGES, TWENTY-SIX PAGES BEING DEVOTED TO DESCRIPTION AND ILLUSTRATION, AND SIX DOUBLE PAGES OF ENGRAVINGS BEING INCLUDED. THIS EDITION WILL BE MAILED TO ANY ADDRESS FOR 50 CTS. SENT TO THE MARINE REVIEW, CLEVELAND, O.



## SECOND NORTHERN LINE SHIP.

Great Display on the Occasion of her Initial Trip out of Cleveland—Famous Statesmen of Ohio and Business Men from all parts of the State join in the Ceremony—Semi-weekly Passenger Service now between Buffalo and Duluth.

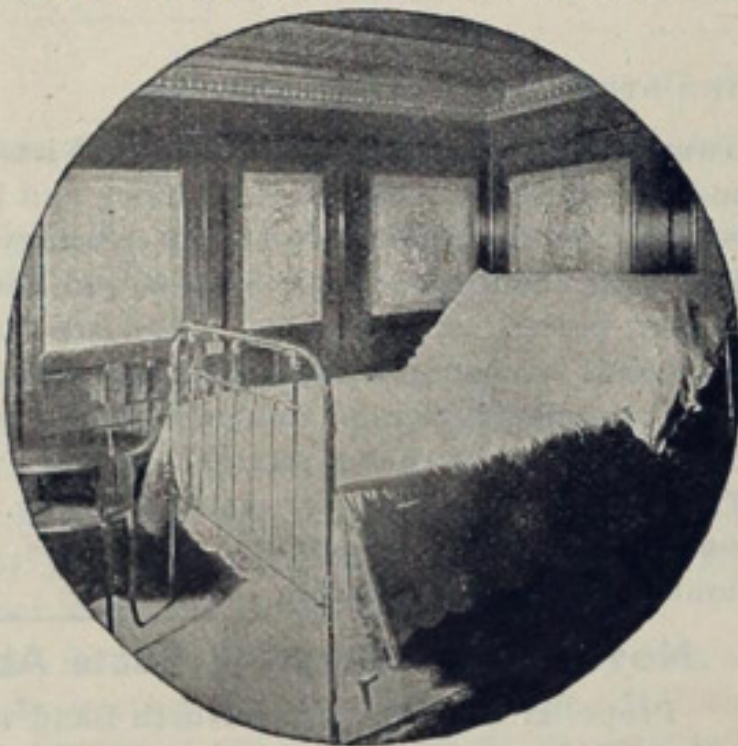


**M**ORE than a thousand representative business men, members of commercial organizations of leading cities of Ohio, joined the Cleveland Chamber of Commerce on Thursday last in dedicating the steamship North Land, second of the Northern line passenger steamers. The occasion was one of a big gathering of Ohio business men in Cleveland, and the guests of the Cleveland organization included many famous Ohioans, statesmen and

great politicians, who honored the initial trip of the North Land with their presence. Among them were Governor McKinley, Senator Sherman, General Bushnell, Senator Brice, Hon. M. E. Ingalls and many others. The Cleveland Chamber of Commerce had planned a big entertainment for the members of boards of trade, chambers of commerce and other business organizations of Buckeye cities. Excursions to manufacturing establishments, public institutions and other places of interest in the city were planned for the day, and a banquet of elegance and great proportions arranged for the evening, but the trip on the new steamer, which had just been turned over to her owners by the Cleveland builders, was probably the most enjoyable feature of the celebration.

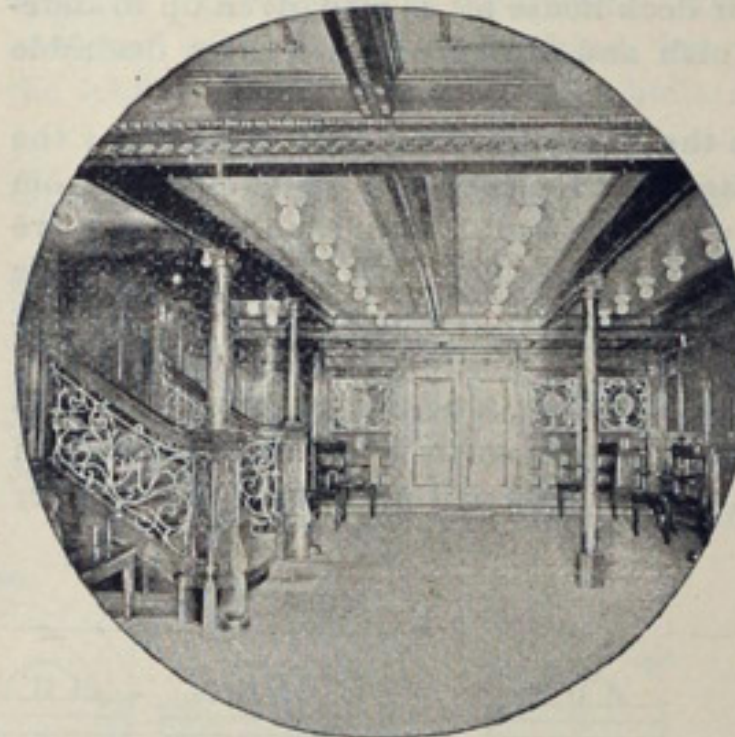
It had been arranged to have the North Land leave Cleveland for Buffalo a few days previous to the time fixed for the entertainment of business men of the state, but through the efforts of Mr. Luther Allen, secretary of the Globe Iron Works Co., and who is also a leader in affairs of the chamber of commerce, the management of the Northern line was prevailed upon to hold the boat, and carry on here some of the finishing work which it was intended to do in Buffalo. The result was advantageous to everybody concerned. The steamship company profited by showing one of its big ships to a body of business men from interior Ohio cities who learned enough of lake passenger service in a single day to prompt them to seek recuperation here, and the trip of a few hours on the lake was as much a novelty to the visitors as a ride on any of the big Atlantic liners. With music, and refreshments spread for hundreds on the long open deck of the steamer, there was a festive air to the excursion, but there was also, from representatives of the different Ohio cities, a long line of business-like addresses that were entirely fitted to the dedication of the ship.

Judges, lawyers, merchants and manufacturers from Cincinnati, Columbus, Toledo, Dayton, Springfield and other places made short addresses suited to the occasion, and after the different cities had been heard from, President Day of the Cleveland organization acknowledge the courtesy of the Northern Steamship Co. in giving up the ship to the chamber for the entertainment of the business men. He also referred to the enterprise of the company in putting about a million and a half dollars into the two ships, and introduced Mr. F. P. Gordon, assistant to the general manager of the line, who was very cordially received. Mr. Gordon said that the company had come to regard it as a regular thing to have the Cleveland Chamber of Commerce dedicate its ships. He hoped to meet with success sufficient to permit of more vessels of the kind being built shortly. The trip was pronounced a success in a remarkable sense, as it would have been impossible to entertain the great number of guests in a lake excursion if it were not for the advantages offered in the broad cabins and long open deck of the North Land.



## Description of the Vessels.

On numerous occasions during the past three years, while this vessel and the ship that preceded her, the North West, were under construction the REVIEW has described all parts of them in detail. In our issue of June 30, 1894, full fifteen pages of reading matter was given up to describing every feature of interest in the North West as she left Buffalo on her first trip up the lakes. Illustrations published at that time were the finest



ever gotten out in connection with a marine publication in this country. It is unnecessary, therefore, to go into any extended description of this second boat, as the two are duplicates in every respect excepting unimportant changes in quarters on the main deck forward, where it was at first intended to carry immigrants.

In the spring of 1892 James J. Hill and John Gordon of the Northern Steamship Co. decided to build

two exclusively passenger steamers capable of making 20 miles an hour between Buffalo and Duluth. The following August the Globe Iron Works Co. of Cleveland laid the keel for the North West, which was successfully operated last season, and Wednesday morning of this week, June 12, 1895, the second of the two ships stopped at Cleveland on her first trip up, while on the same evening the North West stopped on her way down, thus inaugurating a semi-weekly round trip service between Buffalo and Duluth, connecting intermediate lake cities. Detailed dimensions of the two steamers, North West and North Land, are as follows:

## FEATURES OF HULL, ENGINES AND BOILERS, STEAMERS NORTH WEST AND NORTH LAND.

HULL.			
Length over all	383 feet.	Stroke	42 "
" betw'n perpendiculars	360 "	I. H. P., total	7,000
Breadth, moulded	44 "	Steam pressure	195 lbs.
Depth, "	26 "	Speed at 120 revolutions	20 miles.
Load draft	14 "	PROPELLERS.	
Load displacement	4,482 tons.	Number of blades	4
Tonnage, gross registered	4,244 "	Diameter	13 feet.
" net	2,340 "	Pitch	18 "
Capacity of coal bunkers	1,000 "	BOILERS.	
" " water bottom	682 "	Number in forward group	10
Passengers, cabin	442	" " center	8
" steerage	211	" " after	10
" crew	147	Total	28
" total	800	Grate surface, one boiler	29 sq. ft.
ENGINES.		" " total	812 "
Twin vertical quadruple expansion; high pressure forward, followed by first and second intermediate and low pressure.		Heating " one boiler	920 "
		" " total	25,760 "
		Heating surface for 1 sq. ft.	
		grate surface	31 "
		Pressure allowed	267 lbs.
		Total weight of boilers with water	400 tons.
		Floor space occupied by one boiler	7' 9" x 6' 6"
		Height from fire room floor	11' 4"
		Grates, "Ætna," shaking.	
CYLINDER SIZES.			
High pressure	25 inches.		
First intermediate	36 "		
Second	51½ "		
Low pressure	74 "		

These steamers are built entirely of mild steel under the rules and inspection of the United States Standard Register. An inner bottom extends from the collision bulkhead forward to the after-peak bulkhead, and transverse and longitudinal bulkheads divide the hull into numerous water-tight compartments, insuring entire safety. Another element of strength is the continuation of the framing and plating around the shafts of the twin screws to within a short distance of the propellers.

On the main deck forward is the large saloon dining room, a grand staircase leading from the saloon deck above. In other parts of this deck are the officers's quarters, and just aft of the engine room are the quarters of the engineers, clerks and stewards. The officers' mess-room is also on this deck. With the exception of spaces fore and aft required for working anchors, the spar or saloon deck is entirely given up to the accommo-



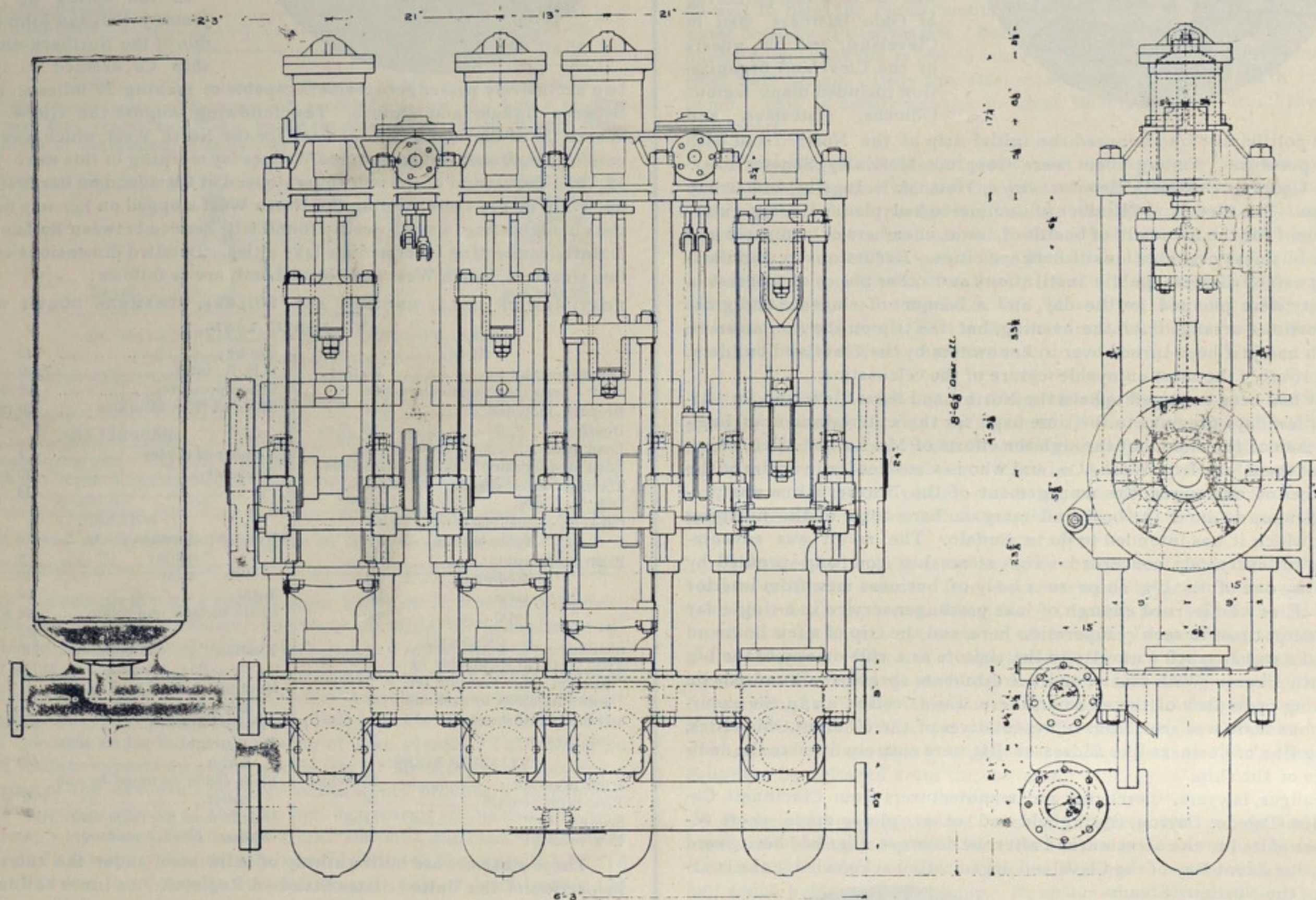


dation of first-class passengers. The space for promenading and for steamer chairs on the open deck given up to passengers will compare favorably with such facilities on the finest Atlantic liners. At the forward end of this deck are the largest and handsomest staterooms, such as are used by noted personages and millionaires when crossing the Atlantic. A smoking and observation room occupies considerable of this forward house and at the after end of it is the reading room and observation saloon for ladies. A similar deck house aft is also given up to staterooms and parlors of elegant finish and altogether of a most desirable kind.

Experts who have ridden on the North Land say that she is if any the stiffer of the two boats, and better speed is expected from her than from the North West, although it is, of course, well known that both boats are constructed in the staunchest manner possible. Some alterations made in the machinery of both steamers since the North West made her first trip have resulted in smoother working of machinery and higher speed. There is little doubt of the boats fulfilling schedule requirements this season, as it is quite certain that they will make 20 miles an hour when such a rate of speed is required. Both boats will stop at Mackinaw after June 23.

by sixteen round columns with collars and nuts to support the cast iron brackets. The cross-head and piston rod of the steam cylinders are of steel, in one piece, and are fitted with brasses for the connecting rod pins. The shoe is of cast iron bolted to this cross-head and lined with babbitt. The pump valves are of brass with the suction and discharge valves one above the other in the same chamber, and they are quite large and have only a small lift. All of the joints and bolts to the steam and water ends are made interlocking, as well as the joints in the feed pipes, to withstand the high pressure at which the feed water is forced into the boilers. The pumps make from 15 to 20 revolutions per minute and run very quiet and smoothly. The idea of the design originated with Mr. R. W. Peck, and the design was worked out and the pumps built and installed in place by the Globe Iron Works Co.

The air pumps, one for each engine, are of the vertical compound type, taking water and air from a jet condenser. Steam cylinders are 15 and 30 inches by 18 inches stroke, and the water cylinders 38 inches diameter by 18 inches stroke. The steam cylinders are placed directly over the water cylinders and are supported on four round wrought iron columns. The two steam cylinders of each pump are connected by a pair of beams, coupled to the cross-head by short links. The cross-head has





long would be required to equal the nominal horse power of the engines of this boat.

A \$20,000 plumbing outfit insures fresh water, hot and cold, to all parts of the vessel.

Power enough is contained in this steamship to lift herself 100 feet high in four minutes.

The ship's twenty-eight boilers have a total heating surface of 25,760 square feet, over half an acre.

Ice machinery in the hold of the boat cools 4,500 cubic feet and freezes over a half ton of ice daily.

Every time the steamer moves the length of herself she displaces or pushes aside 1,076,110 gallons of water.

A crew of 147 is required to operate this boat, forty-four being employed in looking after engines and boilers.

The largest and heaviest seamless drawn tubes ever used in an American vessel are in this boat and her sister ship.

Auxiliary machinery on this steamer includes sixty-five steam cylin-

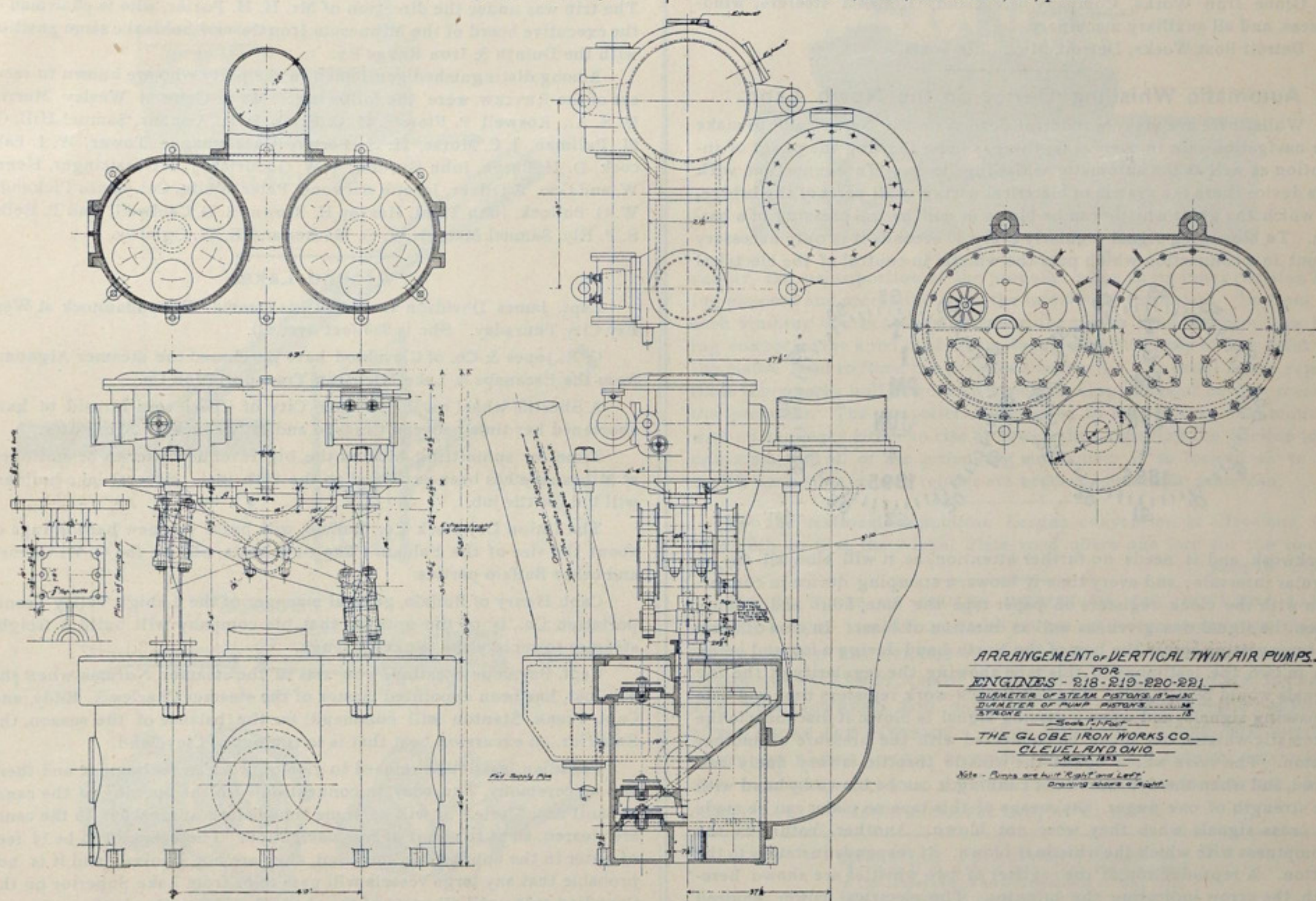
A summary of the propelling power of this vessel may be compared to a room 28 by 29 feet, with fire all over the floor, heating water in a room 10 by 10 by 15 feet into steam at 250 pounds pressure, which in turn churns pistons up and down in cylinders equaling in contents a room 7 by 7 by 8 feet.

The North West and North Land were the first American steamers of proportions suited to commercial purposes to be equipped with quadruple engines. The American liners St. Louis and St. Paul have since been equipped with engines of this kind, but they have Scotch boilers, while the lake steamers have water tube boilers, representing higher practice.

#### Concerns that Furnished Material for the North Land.

The best of material of all kinds was used in the construction of the North Land, and it is therefore a matter of some satisfaction to any concern to be included among the contractors engaged on the work. Following is a list of the firms and corporations whose products form a part of the big boat. Nearly all of them took part also in the building of the North West:

Otis Steel Co., Lim., Cleveland, O., plate.



VERTICAL TWIN AIR PUMPS OF NORTHERN LINE STEAMSHIP NORTH LAND.

ders, twenty-six pump cylinders, six centrifugal pumps, six fan blowers, and three dynamos.

The electric plant has capacity for 1,200 sixteen-candle-power lamps, giving light equal to 19,200 candles. In addition to this the search light is of 100,000 candle power.

A watch ticks twice in a second and 120 times a minute. When the North Land is making 21 miles an hour, her 13-foot propellers make one revolution in the water at the speed your watch is ticking.

To make an aerial ship of the steamer would require 814 balloons, each containing 18,312 cubic feet of gas, having a density of 0.410 that of air. Each balloon would be 260½ feet long by 57½ feet diameter.

A ship of this kind is a hard drinker, as she requires seventy tons of water per hour to keep her from getting thirsty. On a round trip from Buffalo to Duluth she uses a quantity of water that would be equal to a quarter-mile section of a river 9 feet deep and 25 feet wide.

The 4,032 tubes in the North Land's twenty-eight Belleville boilers, if placed end to end, would make a pipe four and a half miles long. The cubical contents of the tubes would equal a room 10 by 10 by 15 feet, and the fire spaces in all the boilers amount in the aggregate to an area 28 by 29 feet.

Cleveland Rolling Mill Company, Cleveland, beams, angles, etc.

Pencoyd Iron Works, Philadelphia, Pa., beams.

Penn Steel Casting & Machine Co., Chester, Pa., steel castings.

Cleveland City Forge & Iron Co., Cleveland, O., shafting.

Syracuse Tube Co., Syracuse, N. Y., boiler tubes.

Bourne & Knowles Mfg. Co., Cleveland, O., rivets.

The John Van Range Company, Cincinnati, O., cooking outfit.

The Upson-Walton Co., Cleveland, O., ship chandlery.

Randolph & Clowes, Waterbury, Conn., seamless copper tubes.

De la Vergne Refrigerating Machine Co., New York, N. Y., refrigerating plant.

B. F. Sturtevant Co., Boston, Mass., blowers.

Chadburn & Son, 11 Waterloo Road, Liverpool, England, telegraph and signal apparatus.

Sherwin-Williams Co., Cleveland, O., paints.

Columbian Steam Pump Co., Chicago, Ill., ash pumps.

H. R. Worthington, New York, sanitary and refrigerating pumps.

Hughes Steam Pump Co., Cleveland, O., ballast pumps.

Edson Mfg. Co., Boston, Mass., hand steering gear.

Frank Morrison, Cleveland, O., compasses.

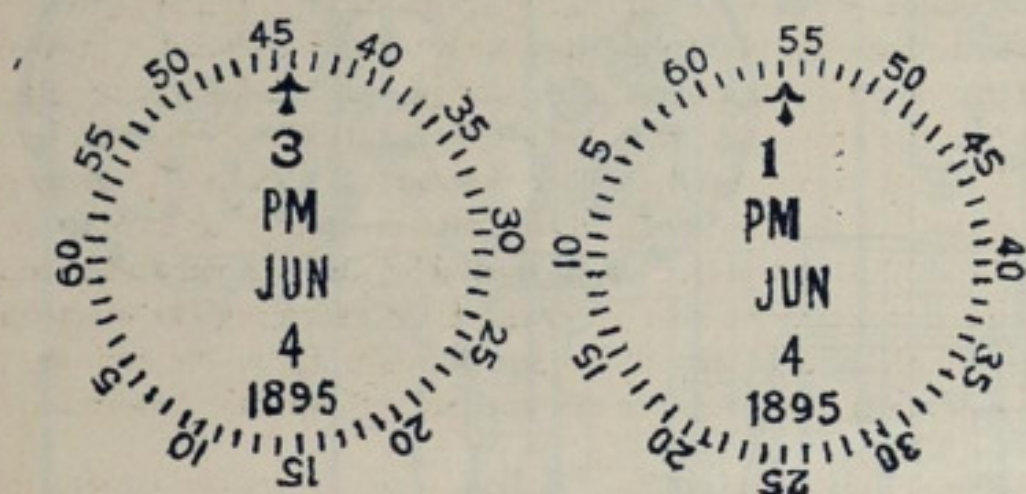
Lawton Bros., & Pratt, Brightwood, Mass., anchors.



L. J. Mattison & Co., Cleveland, O., oils.  
 Viaduct Brass Works, Cleveland, O., deadlights, etc.  
 The Martin-Barris Co., Cleveland, O., wood for cabin finishing.  
 Purdy & McNeil Lumber Co., Cleveland, O., soft wood timber.  
 Pittsburgh White Metal Co., Pittsburgh, Pa., babbitt metal.  
 Merchant & Co., Philadelphia, Pa.; bearing metal.  
 Stowe, Fuller & Co., Cleveland, O., fire-brick for boilers,  
 Gleason & Bailey Mfg. Co., Seneca Falls, N. Y., hand pumps.  
 P. Hayden S-H Co., Columbus, O., anchor chain.  
 The Adams & Westlake Co., Chicago, hardware.  
 Colby & Son, Chicago, Ill., upholstery.  
 Chicago Carpet Company, Chicago, Ill., carpets.  
 Gutta Percha Rubber Manufacturing Co., New York, tiling.  
 L. Katzenstein & Co., 357 West street, New York, packing.  
 Ashcroft Mfg. Co. 111 Liberty street, New York, steam gauges.  
 McGrath & Bisgood, Buffalo, N. Y., mattresses.  
 Mason Regulator Co., Boston, Mass., pressure regulators.  
 Signal & Control Co., New York, N. Y., electrical automatic whistling device.  
 Globe Iron Works, Company, Cleveland, O., steam steerers, windlassess, and all auxiliary machinery.  
 Detroit Boat Works, Detroit, Mich., life-boats.

### Automatic Whistling Device on the North Land.

While there are many wonderful devices on the North Land to make her navigation safe in every way, there is none showing the power of invention as well as the automatic whistling device. In connection with this device there is a system of electrical wiring to all parts of the bridge, by which the great whistle can be blown at will by the pressing of a button. To blow a fog signal regularly every 60 seconds it is only necessary to put in a connection which puts the whistle in control of the electrical



clockwork, and it needs no further attention, as it will blow all day at regular intervals; and every time it blows, a stamping device in connection with the clock registers on paper tape the date, hour and minute when the signal was given, as well as duration of blast. In case of some steamer getting across the bow of the North Land during a fog, and being cut in two, the testimony of this tape showing the regularity of the fog signals would be valuable. The same clock-work registers time and date of passing signals, and when a passing signal is blown it disconnects the automatic whistle, but it can be connected with the pressure of another button. The valve which opens the whistle throttle is very finely balanced, and when the dynamo is not running it can be blown by hand with the strength of one finger. By means of this tape no claim can be made for cross signals when they were not blown. Another feature is the promptness with which the whistle is blown. It responds instantly to the button. A reproduction of the register of two whistles are shown herewith, the arrow indicating the minutes. The electrical power required to operate the whole device amounts to that used by a 16-candle power lamp. The Signal and Control Co. manufacture the device. In addition to the gong signal between the bridge and engine room there is the Chadburn telegraph, which permits of no mistakes. To make assurance doubly sure, however, for contingencies arising that could not be signalled, there is a regular telephone in the dog box connected with one in the engine room.

It has been decided by the Northern line to use Pocahontas coal for fuel on the big passenger liners. This was the coal used when the photograph for our large supplement was taken, and although very little smoke is apparent, fires were being renewed and more smoke was coming from the stacks than at any other time during the trip.

A FULL DESCRIPTION OF THE NORTH WEST, SISTERSHIP OF THE NORTH LAND, WAS PUBLISHED IN THE EDITION OF THE REVIEW, JUNE 30, 1894, CONTAINING FIFTY-TWO PAGES, TWENTY-SIX PAGES BEING DEVOTED TO DESCRIPTION AND ILLUSTRATION, AND SIX DOUBLE PAGES OF ENGRAVINGS BEING INCLUDED. THIS EDITION WILL BE MAILED TO ANY ADDRESS FOR 50 CTS., SENT TO THE MARINE REVIEW, CLEVELAND, OHIO.

### Minnesota Iron Co.'s Complimentary Excursion.

The Minnesota Iron Company's complimentary trip, early this week, from Chicago to Two Harbors and the mining region of Minnesota brought together a company of about 160 capitalists, representing varied big interests in mines, transportation, iron manufacture, etc. The excursion was carried out on an elaborate scale. The steamer North West, which carried the party from Chicago to Duluth, stopped for a few hours at Mackinaw and also at the Sault, and on the trip down Lake Michigan and up Lake Superior developed a rate of speed on several runs that was in advance of the boat's performance last season. All expense attending the trip, from time of leaving Chicago until the return to that point on a special train from Minnesota, was borne by the Minnesota Iron Company. A train of sixteen Pullmans, two dining cars and a baggage car, with five or six private coaches met the party at the head of the lakes, after they had left the big passenger steamer, which had afforded them similar luxuries. The annual meeting of the Minnesota company was held in connection with the trip, but no changes of importance were made in the directory. There was no official talk of a dividend, although it has been reported that payment of dividends is to be resumed by the company. The trip was under the direction of Mr. H. H. Porter, who is chairman of the executive board of the Minnesota Iron Co. and holds the same position with the Duluth & Iron Range Ry.

Among distinguished gentlemen in the party who are known to readers of the REVIEW were the following: Major-General Wesley Merritt, U. S. A., Roswell P. Flower, H. C. Frick, P. D. Armour, Samuel Hill, G. M. Pullman, J. C. Morse, H. H. Porter, Charlemagne Tower, W. I. Babcock, D. H. Bacon, John Gordon, A. W. Goodrich, J. L. Greetsinger, Henry W. and Geo. T. Oliver, Joseph Selwood, Peter White, Col. James Pickands, W. G. Pollock, John Todd, Harvey H. Brown, S. D. Caldwell, Dan P. Eells, S. P. Ely, Samuel Mather, W. G. Mather and E. W. Oglebay.

### Around Lakes.

Capt. James Davidson launched his steamer Rappahannock at West Bay City Thursday. She is 335 feet over all.

C. R. Jones & Co. of Cleveland have purchased the steamer Argonaut from the Escanaba & Lake Michigan Transportation Co.

A Sheriff's wheel on the steamer City of Charlevoix is said to have shortened her time between Chicago and Milwaukee by 20 minutes.

Time for submitting bids on the big revenue cutter to be stationed at Milwaukee has been extended to the 26th inst. Several lake builders will bid for the job.

The Union Dry Dock Co., Buffalo, will build two new harbor tugs of about the size of the Fabian. The new boats will be for O. W. Cheney and other Buffalo parties.

Capt. Henry of Buffalo, general manager of the Lehigh Valley Transportation Co., is of the opinion that his company will build a freight steamer to replace the sunken Cayuga.

Capt. Seymour Stratton, who was in the steamer Norman when she was lost, has been appointed master of the steamer Charles A. Eddy, and Capt. Frank Stenton will command, for the balance of the season, the Superior, an excursion boat that is to run out of Cleveland.

Canadian legislators refused to give up work in parliament and there was no ceremony, Thursday, in connection with the opening of the canal at Sault Ste. Marie. It will be some time before approaches to the canal are cleared, so as to admit of free navigation. There is said to be 14 feet of water in the approaches now, but they are not buoyed, and it is not probable that any large vessels will pass to or from Lake Superior on the Canadian side until all parts of the channel are entirely clear.

As a result of the order from Secretary of War Lamont, giving the passenger steamers of the Northern Steamship Co. the right of way at the St. Mary's Falls canal, protests from vessel owners in different parts of the lakes have been received by officers of the Lake Carriers' Association, and it is probable that the organization will be forced to take action in the matter. There is no doubt of the order being intended for the sole purpose of giving right of way to the North West and North Land, and not to any other passenger boats. The greatest objection will come when some of the big freighters are held at the canal over night as a result of the order. The order to General Poe from the department does not seem imperative in its wording, as it says these steamers are to be passed *as soon as practicable* after arriving at the canal.

The supplemental illustrations in this issue consist of a photochromotype illustration from an oil painting by H. F. Sprague, showing the North Land at night. This is a new process that surpasses lithography for softness of tints and realistic effect. The paper has been rolled carefully, instead of being folded, in order that the picture might not be damaged. With gold matting and a neat frame it presents all the beauty of a miniature oil painting. The large supplement is from a photograph by J. F. Ryder.



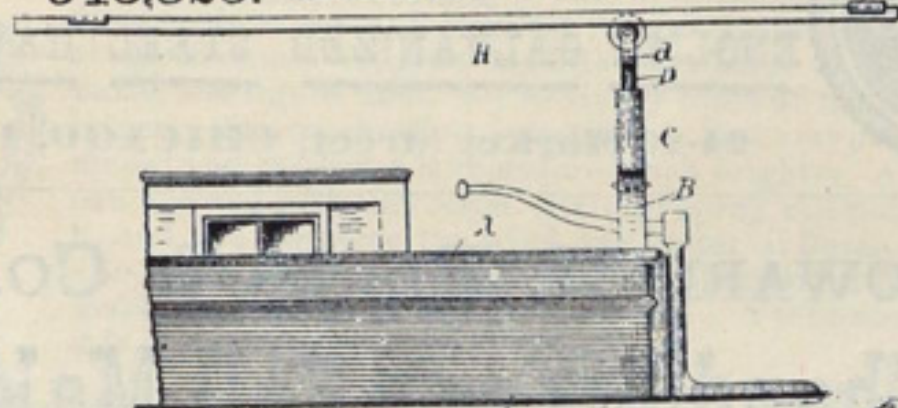
## Illustrated Patent Record.

SELECTED ABSTRACTS OF SPECIFICATIONS OF A MARINE NATURE—FROM  
LATEST PATENT OFFICE REPORTS.

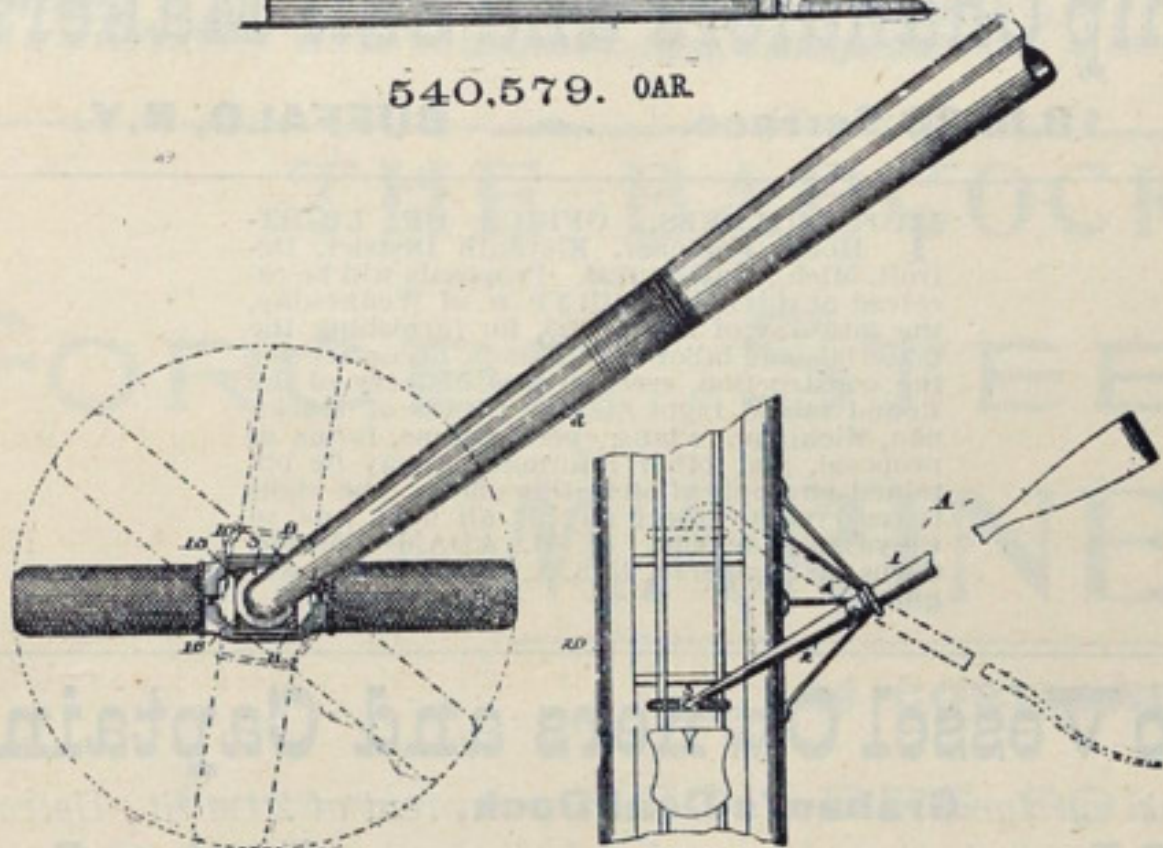
540,325. Electric Trolley for Canal Boats. Alonzo C. Mather, Chicago, Ill. Filed Dec. 1, 1893. Renewed May 3, 1895. Serial No. 548,057.

Claim. The combination, with a canal boat, of a set of double trolley wires or plates; a trolley which rolls upon said wires or plates and has an enlarged portion which extends up between said wires or plates and prevents a lateral movement of said trolley; a spindle with jaws for holding said trolley wheel; a casing inclosing said spindle, which casing is attached firmly to the canal boat and allows a vertical movement of said trolley while a lateral movement is prevented, and within said casing, a spring so arranged that it may be adjusted in relation to said spindle.

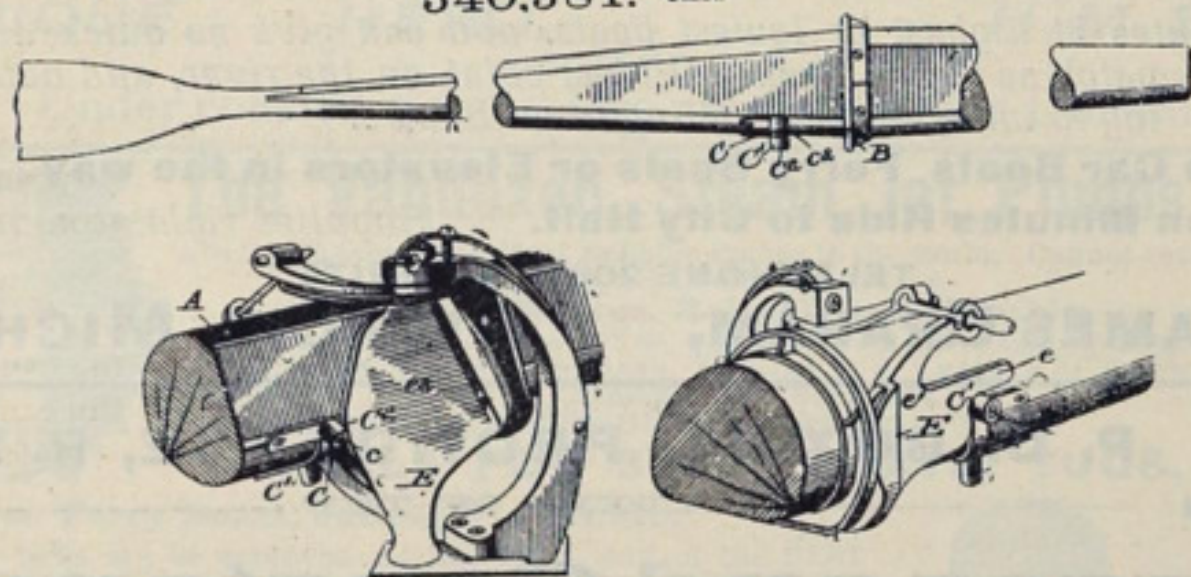
540,325. ELECTRIC TROLLEY FOR CANAL-BOATS.



540,579. OAR.



540,581. OAR.



540,579. Oar. Michael F. Davis, Detroit, Mich. Filed March 15, 1895. Serial No. 541,927.

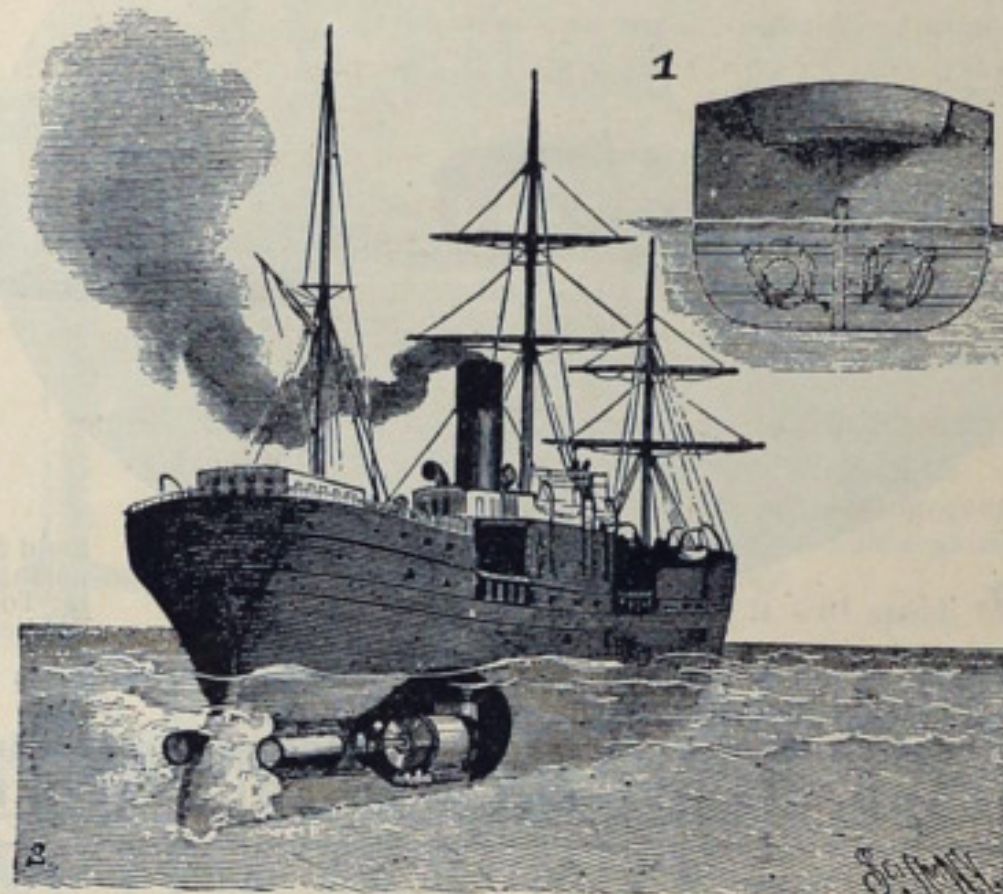
The combination with an oar or sweep and the annular collars on the inner ends of the inboard portion, of the plates or bearings having semi-circular extensions the handles secured to said extensions, and the boxes engaging with the bearings on the inboard portion.

540,581. Oar. Michael F. Davis, Detroit, Mich. Filed March 30, 1895. Serial No. 543,864.

Claim. The combination with a row lock, having the usual uprights and an outward extending projection on the outboard portion of one, of an oar provided with a collar on the inboard portion of the row lock section and studs or stops on the outward portion, adapted to engage respectively with the outwardly extending projection of one upright and the outer face of the other.

## A Cylindrical Propeller.

A patent has been issued in this country to Mr. Lorenzo Julia y Puig of Barcelona, Spain, a captain in the Spanish merchant marine, for the invention illustrated herewith. Two propellers are preferably employed, according to this improvement, one at each side of the keel, the propeller having the same weight as the water to be displaced, and being forced outward by steam power and returned by the pressure of the water in its rear. The propeller is a hollow cylinder, moving in a stuffing box through openings at each side of, and so as not to interfere with, the



rudder, the major portion of the propeller when in its inner position being exposed and accessible from the interior of the vessel. In front of each stuffing box is a steam cylinder, the piston head and propeller being connected by a rod, and steam being admitted only to the front of the piston head to force the propeller outward. The small figure represents the vessel's hull fitted with strengthening plates or bars to receive the propeller. The propeller is designed to have a very easy motion, with no tendency either to rise or lower, thus reducing the friction to a minimum, and all of the propelling mechanism is so located as to be readily accessible in case repairs are needed.—Scientific American.

For the National Republican League convention at Cleveland, O., June 18th to 21st, the Nickel Plate road offers one fare for the round trip. June 18—263

THREE BOOKS OF SAILING DIRECTIONS, ONE COVERING LAKE SUPERIOR AND THE ST. MARY'S RIVER ANOTHER COVERING LAKE MICHIGAN AND THE STRAITS OF MACKINAC, AND A THIRD TAKING IN LAKES HURON AND ST. CLAIR WITH DETROIT AND ST. CLAIR RIVERS, ARE NOW OFFERED FOR SALE BY THE HYDROGRAPHIC OFFICE. THESE BOOKS ARE PARTS OF A WORK THAT WILL COVER THE ENTIRE CHAIN OF LAKES. THEY CONTAIN CHARTS OF LEADING CHANNELS AND HARBORS, AND MAY BE HAD FROM THE MARINE REVIEW, 516 PERRY PAYNE BUILDING, CLEVELAND, AT \$1 EACH.

TREASURY DEPARTMENT, WASHINGTON, D. C., June 6, 1895. The time named in the Department advertisements of May 27th, 1895, for receiving proposals for the construction of two steam propellers for the United States Revenue Cutter Service, for the Great Lakes and the New England coast, is hereby extended, and bids for the same will be received at this Department until 2 o'clock P. M., Wednesday, June 26, 1895. S. WIKE, Acting Secretary.

TO IRON MANUFACTURERS. OFFICE of U. S. Light-House Engineer, Eleventh District, Detroit, Mich., May 31, 1895. Sealed Proposals will be received at this office until 3 o'clock P. M. of Wednesday, the 26th day of June, 1895, for furnishing the materials and labor of all kinds necessary for the completion and delivery of the metal work for the Round Island Light Station, Straits of Mackinac, Michigan. Plans, specifications, forms of proposal, and other information, may be obtained on application to this office. The right is reserved to reject any or all bids, and to waive any defects. M. B. ADAMS, Major, Corps of Engineers, U. S. A., Lighthouse Engineer. June 13

Chain Department \* P. HAYDEN S. H. CO. \* Columbus, Ohio.

Our Chain in use on the Largest Steamers on the Lakes:  
The Zenith City, Victory,  
North West and North Land,  
and many others.



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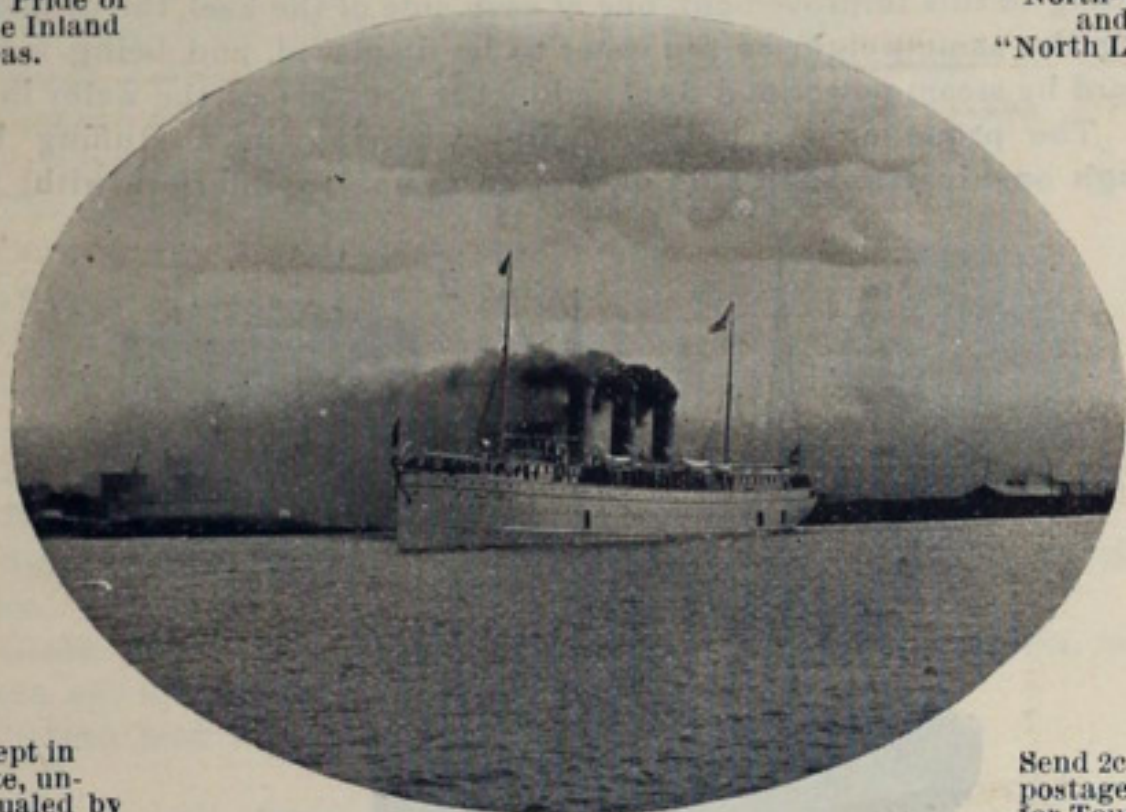


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Length, 400 feet,

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Bottom, 55 "

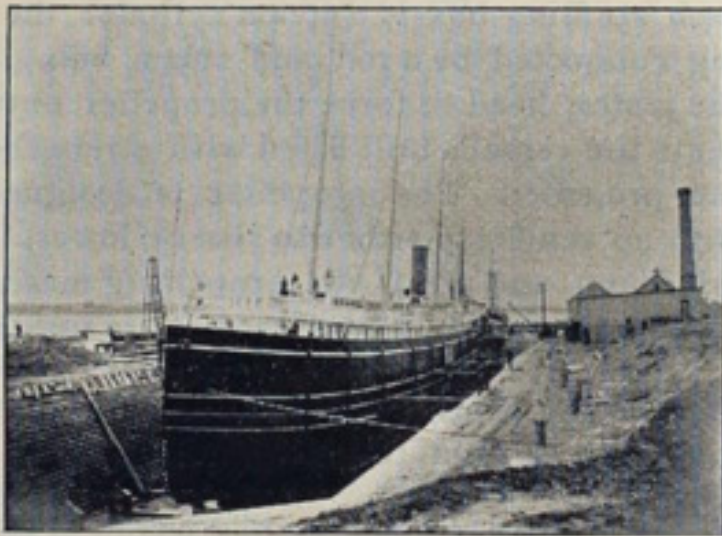
Gate, 62 "

Depth:

To Floor, 20 ft.

To Sill, 18 ft.

On Blocks, 16 ft.



Dry Dock large enough to dock the largest steamers on the lakes. Docking, Repairing and Spar Making. Dock has pit to ship rudders. **THIS IS THE NEAREST MODERN DOCK TO THE SAULT OR MACKINAW.**

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18 to 26 Terrace. ——— BUFFALO, N.Y.

TO BUILDERS. OFFICE OF LIGHT-House Engineer, Eleventh District, Detroit, Mich., May 31, 1895. Proposals will be received at this office until 3 P. M. of Wednesday, the 26th day of June, 1895, for furnishing the materials and labor of all kinds necessary for the construction, erection and delivery of the Round Island Light Station, Straits of Mackinac, Michigan. Plans, specifications, forms of proposal, and other information may be obtained on application to this office. The right is reserved to reject any or all bids, and to waive any defects. **M. B. ADAMS**, Major, Corps of Engineers, U. S. A., Light-House Engineer. June 13

## To Vessel Owners and Captains

Look out for **Graham's Coal Dock**, foot of 21st St., Detroit. **100 Tons**, best quality, on hand all the time **Fresh on Cars**. You can get it from **Chutes, High Platform or Deck**.

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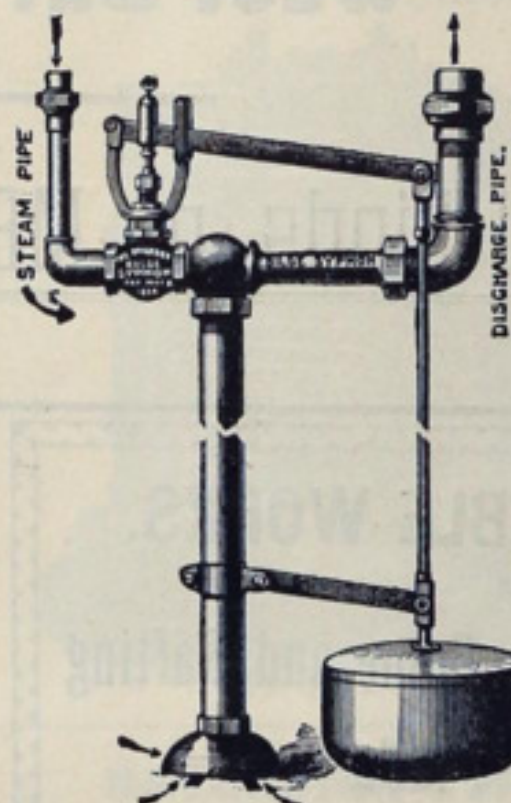
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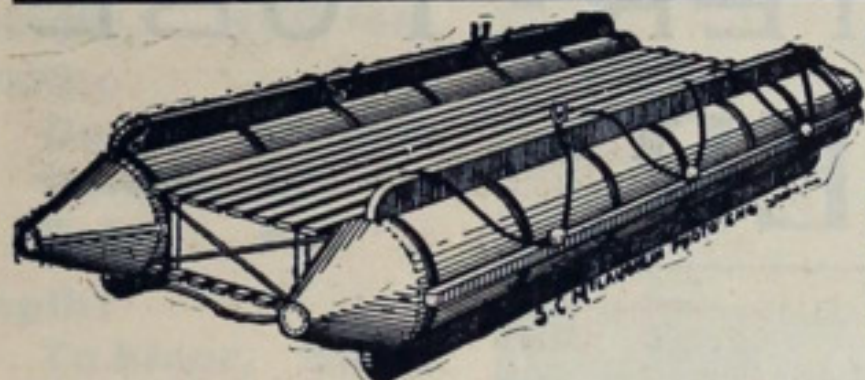
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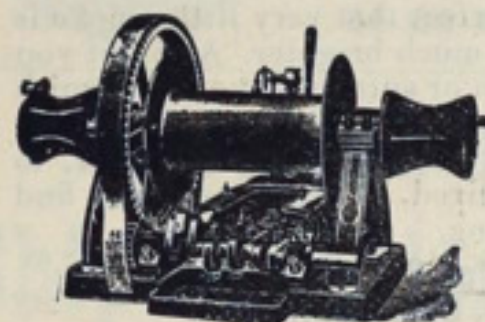
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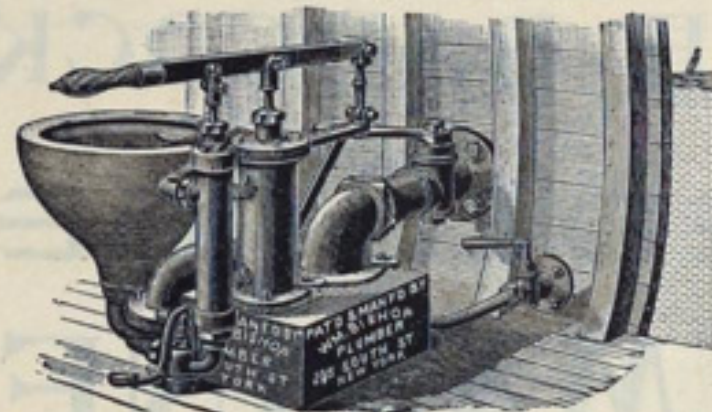
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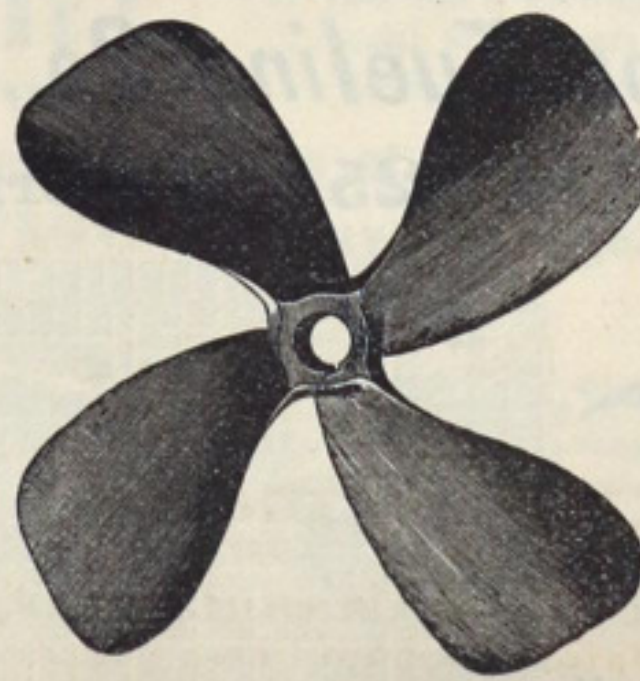
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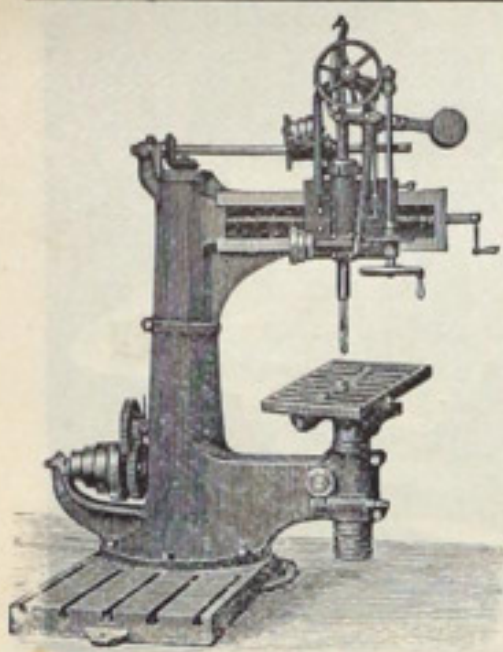
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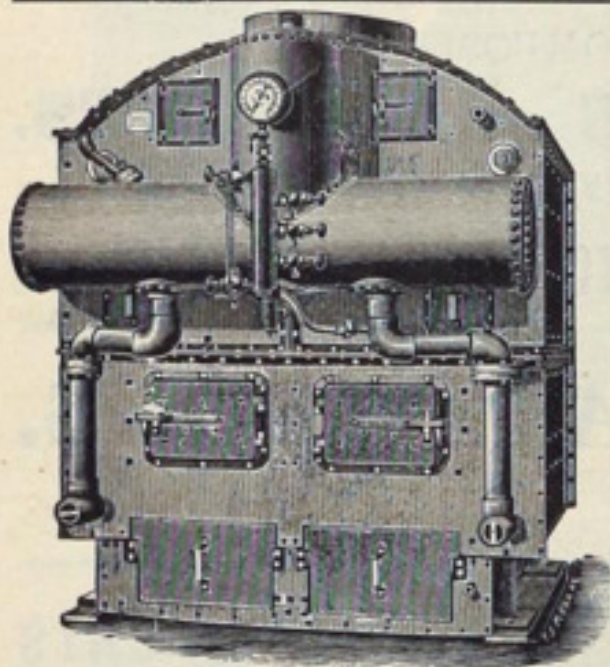
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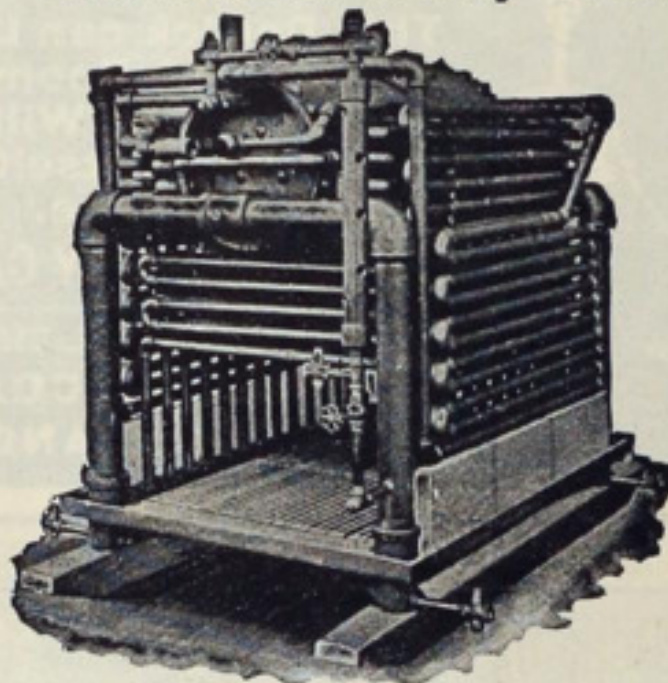
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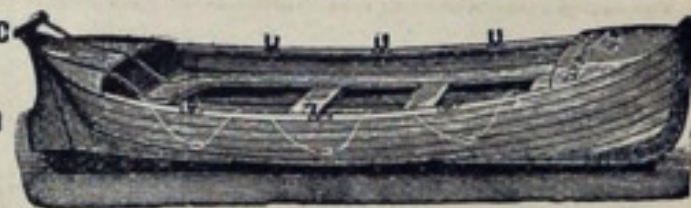
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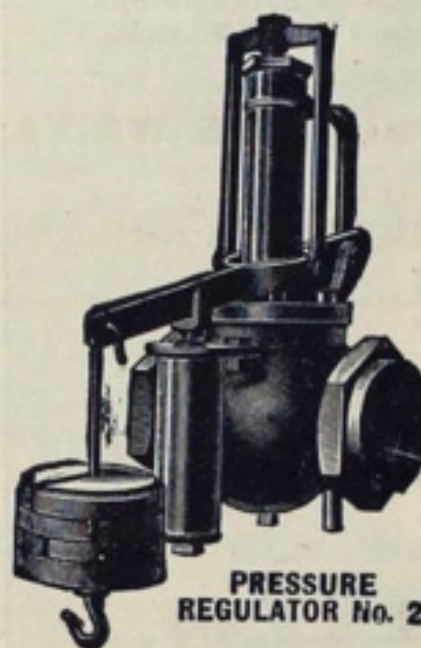
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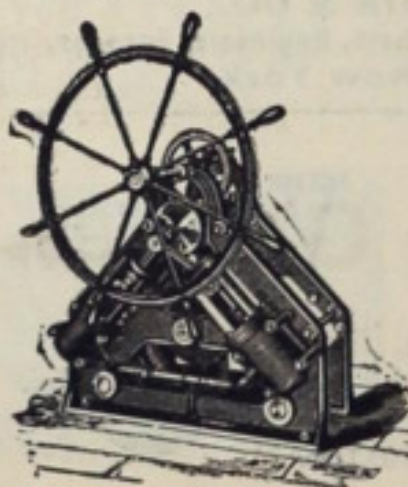
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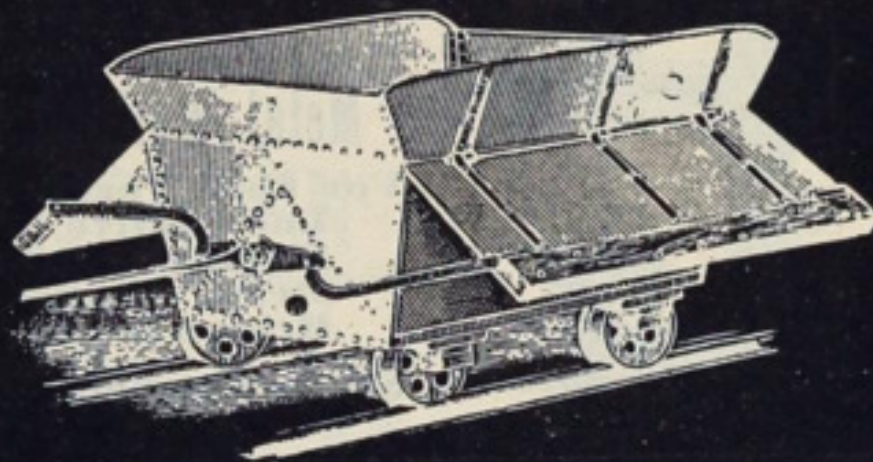
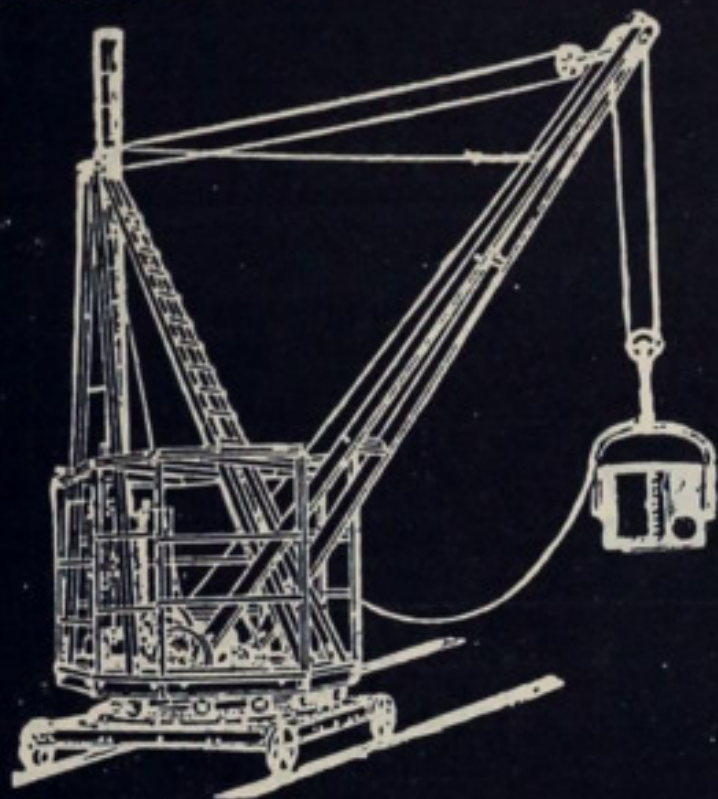
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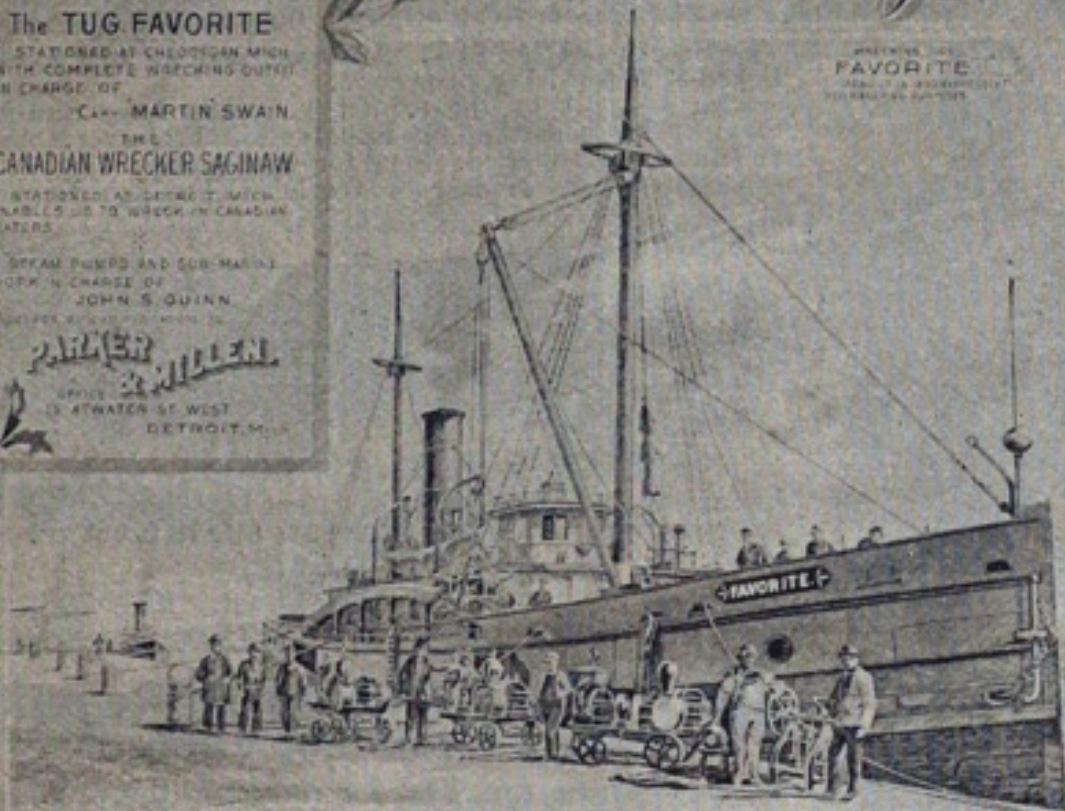
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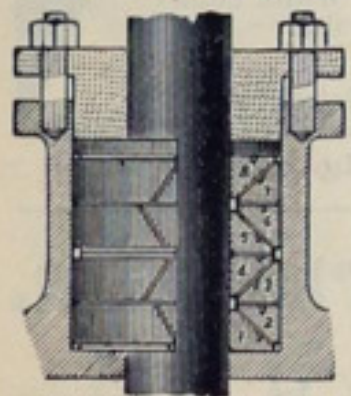
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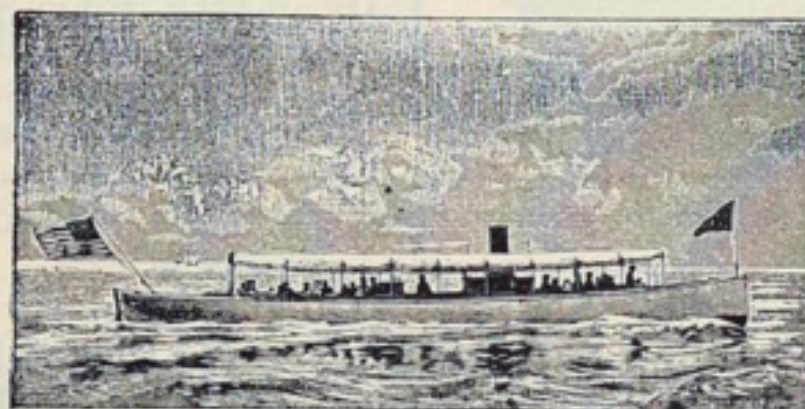
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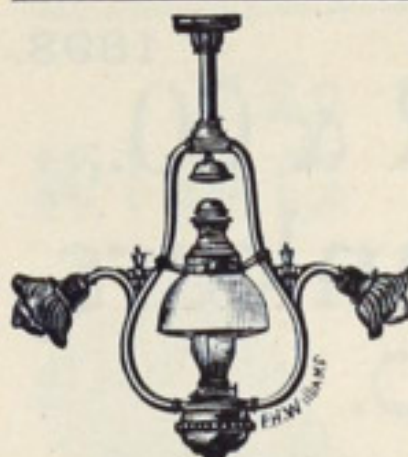
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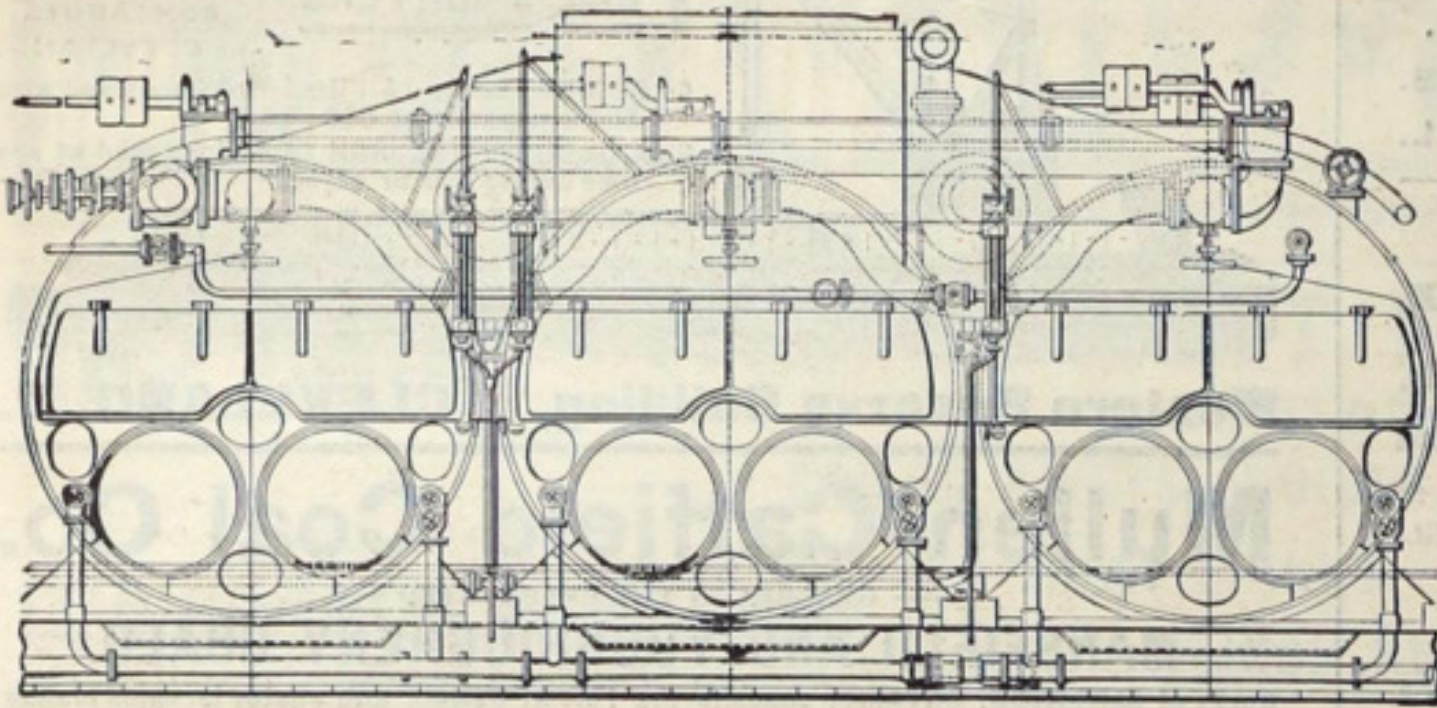
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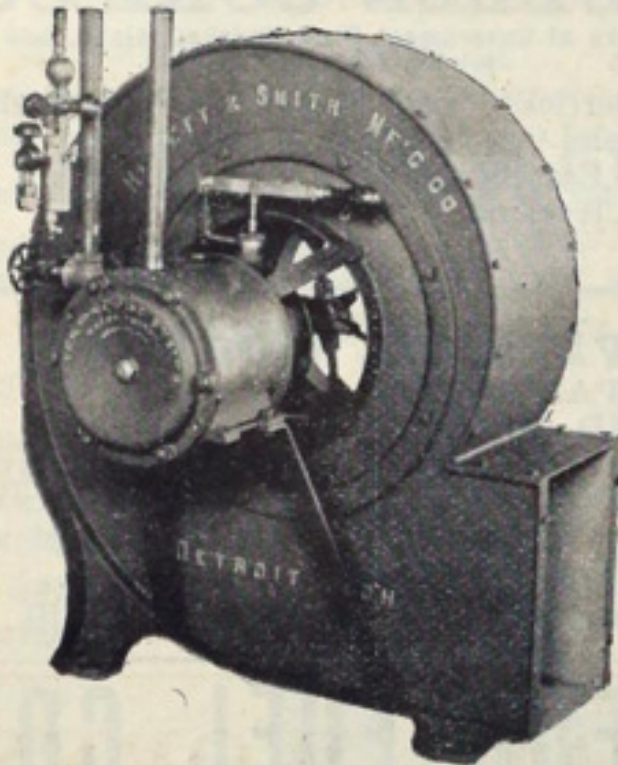
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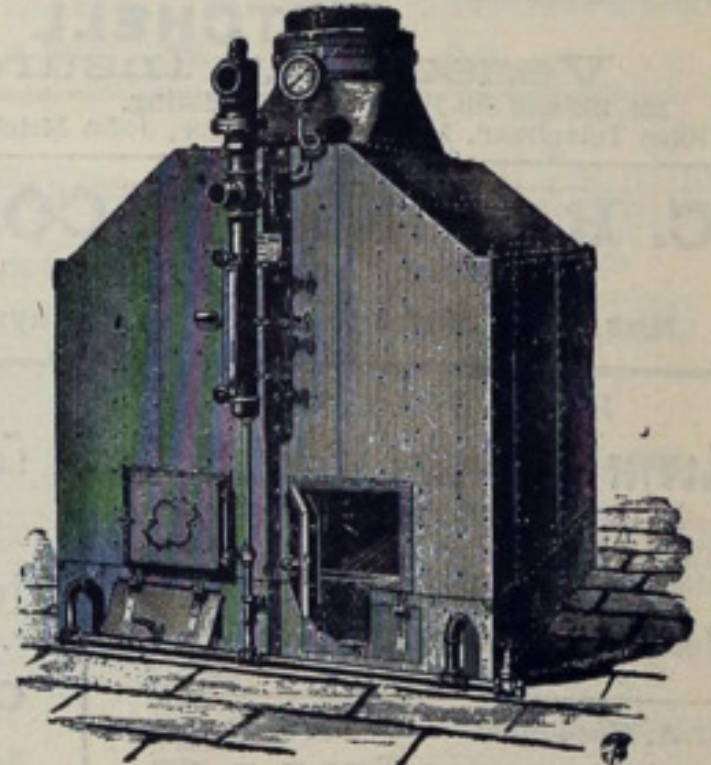
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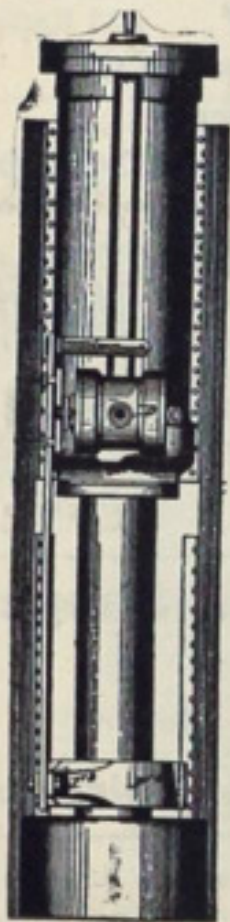
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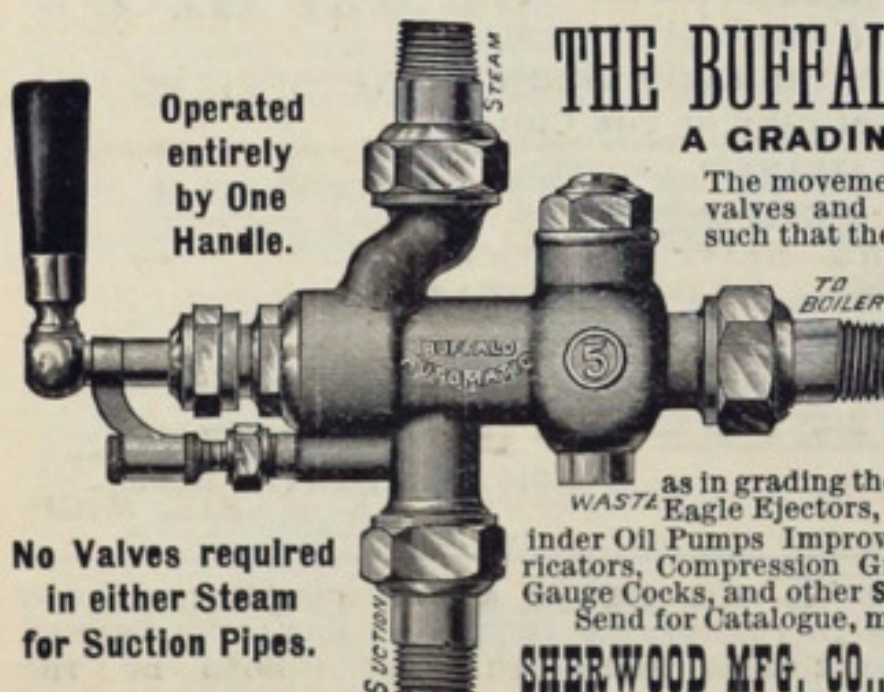
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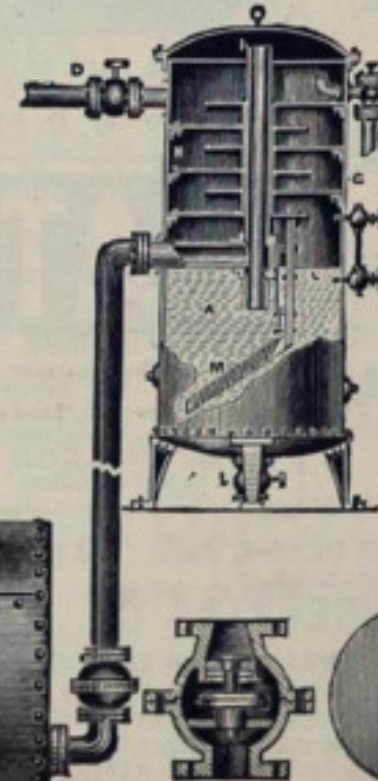
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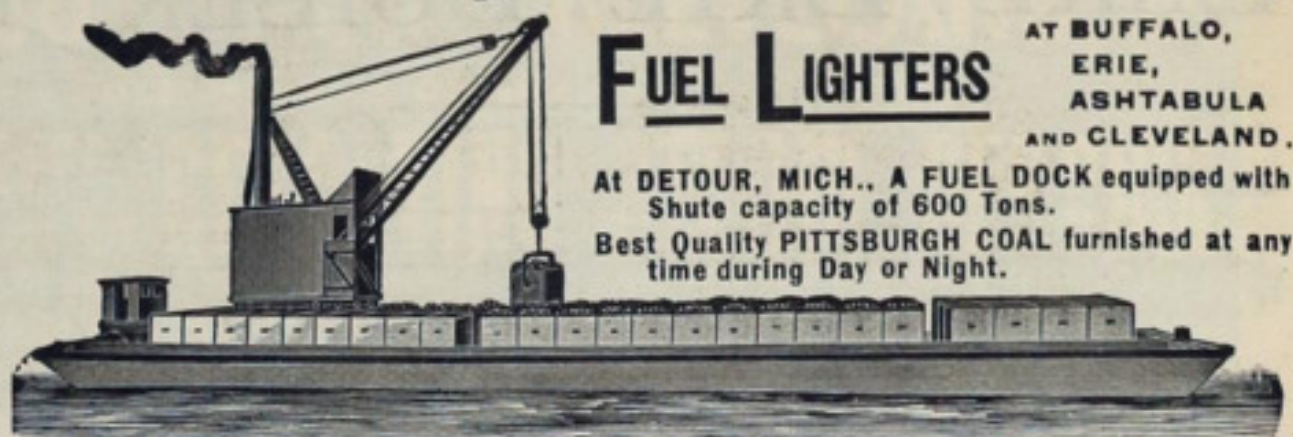


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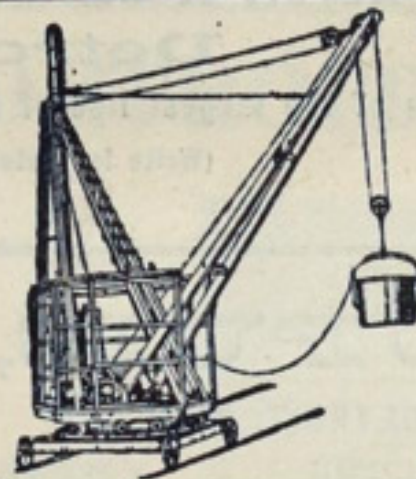
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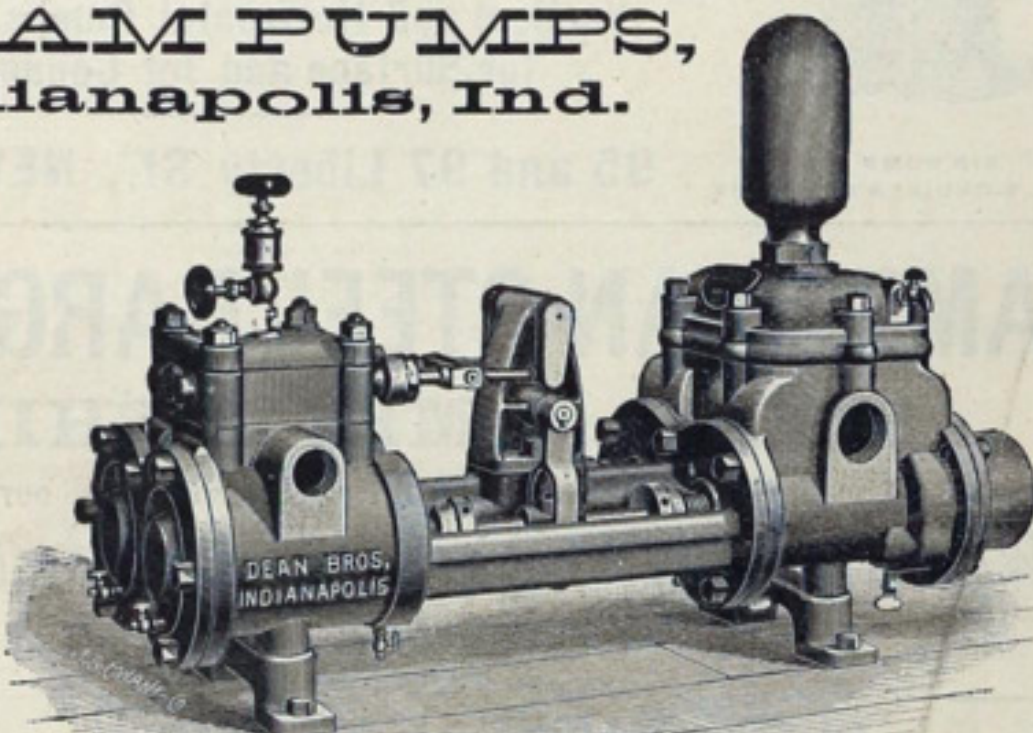
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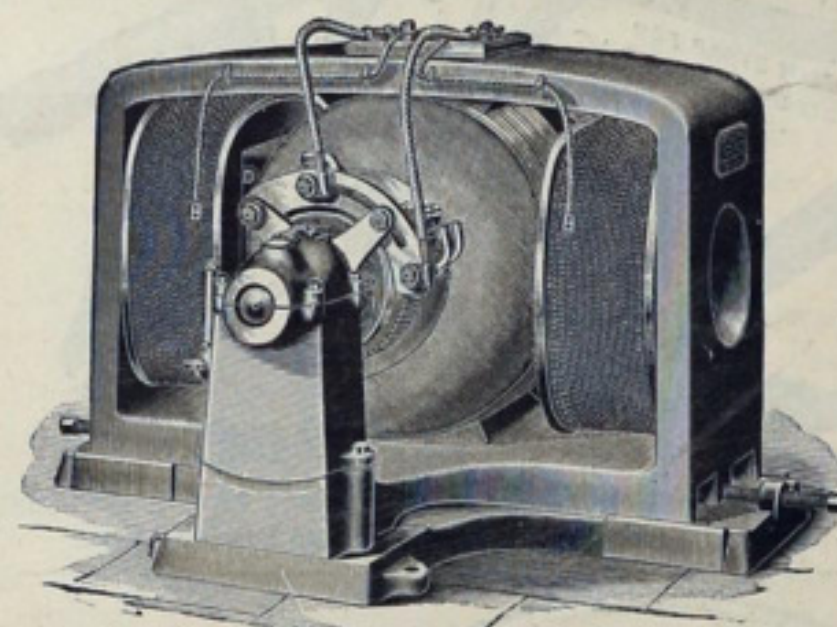
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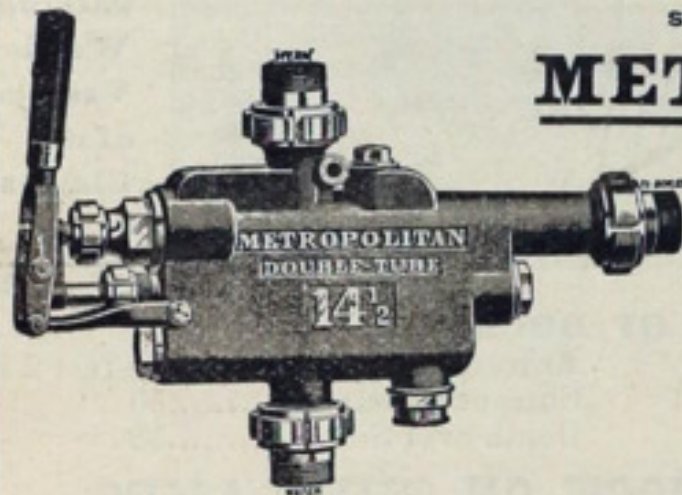
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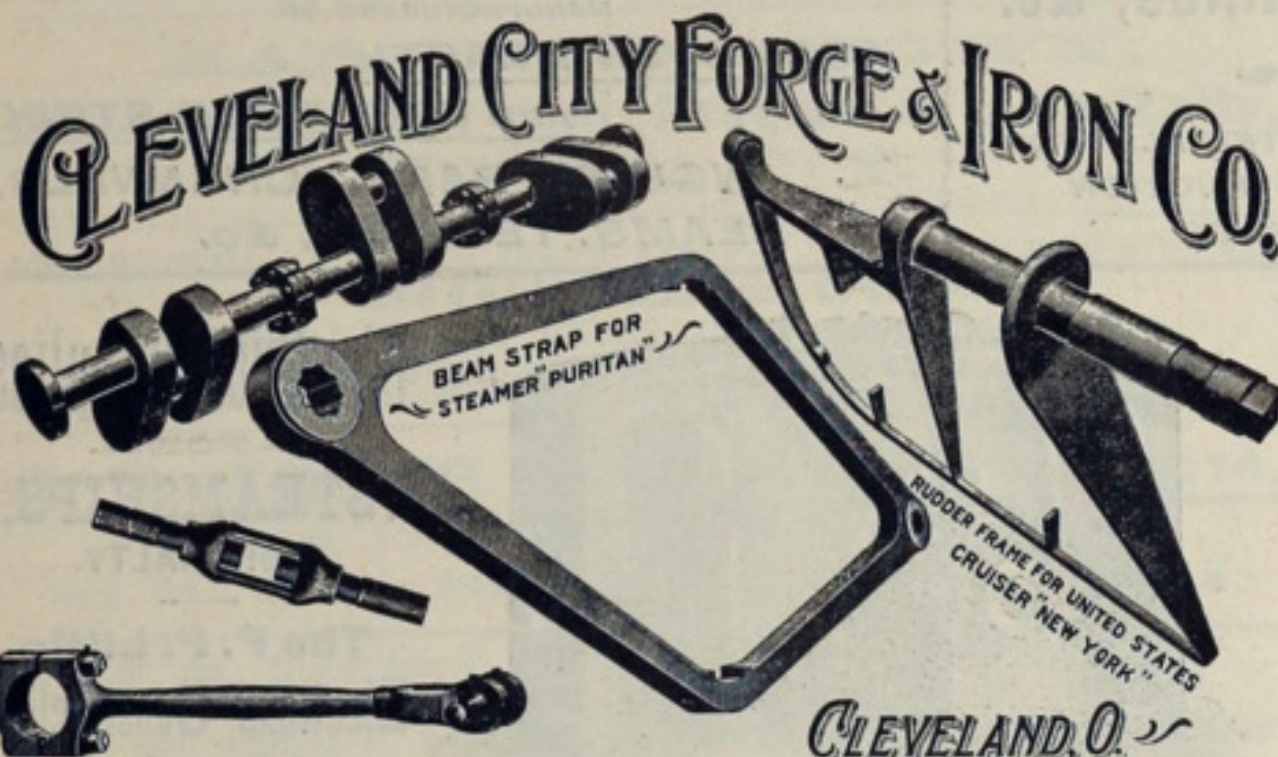
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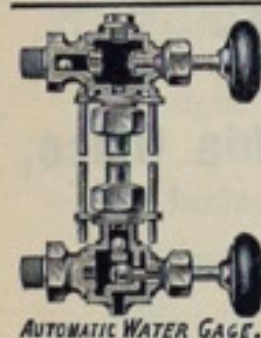
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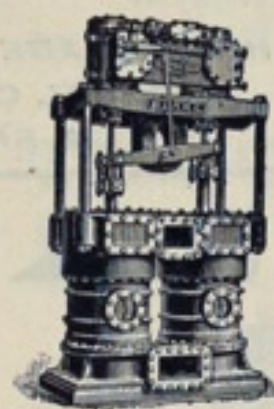
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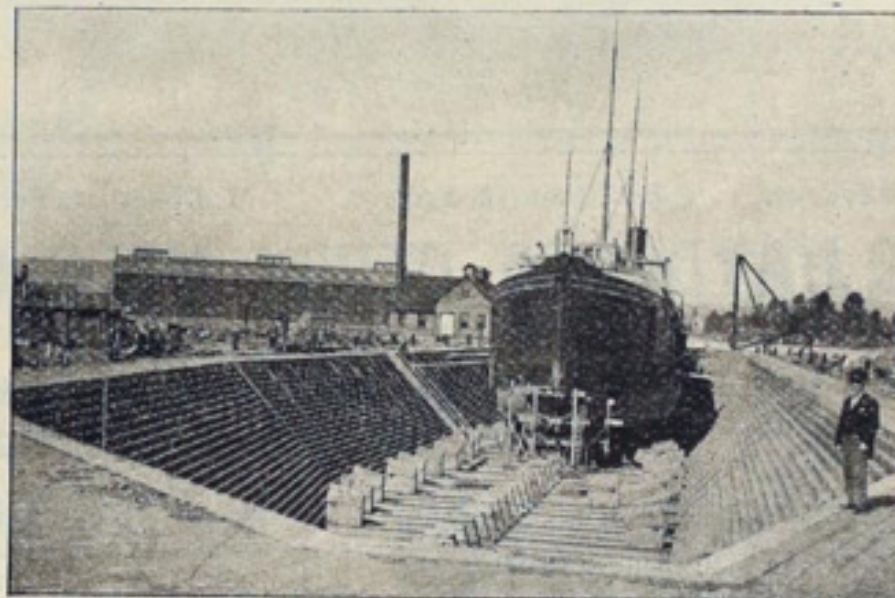
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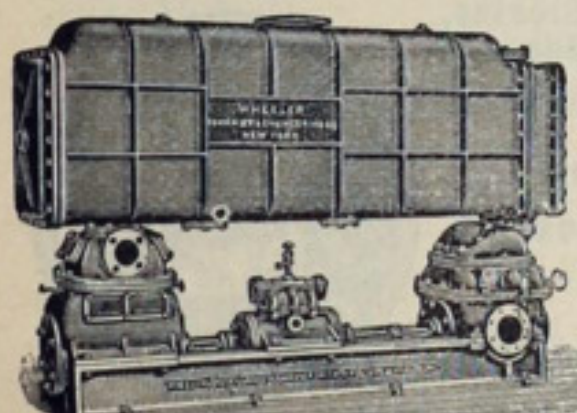
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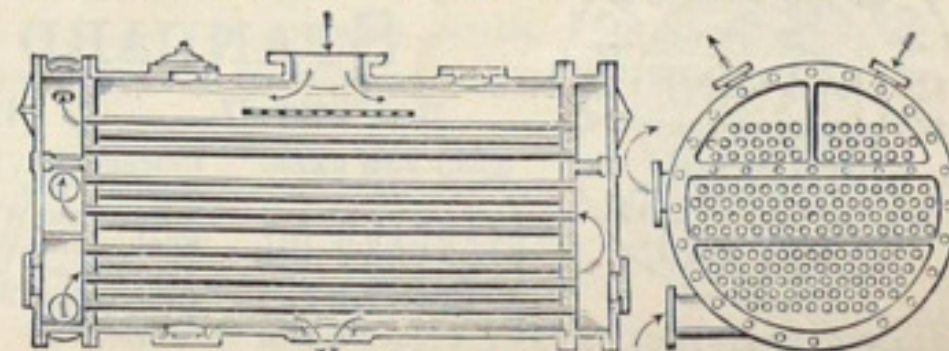
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